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Report of the Working Group on the Interception of Mainland Salmon in Newfoundland

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April 1982

REPORT OF THE WORKING GROUP[1]
ON THE INTERCEPTION OF MAINLAND SALMON IN NEWFOUNDLAND

by

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This is the fifth Manuscript Report from
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[1] This working group was originally set up under the Program Working Party on Atlantic Anadromous Fishes, but was transferred to Anadromous Catadromous and Freshwater Fisheries Subcommittee (ACFF) of the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC).

PREFACE

This work began as a federal initiative by the now-Department of Fisheries and Oceans to provide insight to mixed stock fisheries for Atlantic salmon. The Working Group used information bases and methodology available at the time. Thus, the report must be viewed as a report of progress toward a goal of reaching thorough understanding of Canada's Atlantic salmon resource.

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The following people participated to varying degrees in the deliberations of the Working Group.

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ABSTRACT

Pippy, J. [Chairman] 1982. Report of the Working Group on the Interception of Mainland Salmon in Newfoundland. Can. MS Rep. Fish. Aquat. Sci. 1654: x + 196 p.

This report presents the findings of the Department of Fisheries and Oceans Working Group established in 1975 to investigate the harvest of non-Newfoundland and Labrador origin salmon in the Newfoundland and Labrador commercial fisheries. The catches were assessed by week and Statistical Area. The impact of seven options to reduce the harvest of non-Newfoundland-Labrdor origin salmon is presented.

Key words: Atlantic salmon, commercial salmon fishery, salmon management, interception

RÉSUMÉ

Pippy, J. [Chairman] 1982. Report of the Working Group on the Interception of Mainland Salmon in Newfoundland. Can. MS Rep. Fish. Aquat. Sci. 1654: x + 196 p.

Ce rapport presente les donnees de divers groupes de travail du ministère des Pêches et Océans, fondés en 1975, afin d'analyser la récolte de saumons d'origine autre que celle des pêcheries de Terre-Neuve et Labrador. Le prises ont été evaluées par semaine et par région statistique: L'impact de sept options pour la diminution des récoltes du saumons d'origine differente de Terre-Neuve et Labrador est également presenté.

INTRODUCTION

This Working Group was established at the April 1975 meeting of the Program Working Party on Atlantic Anadromous Fishes. Its prime objective was to study Newfoundland's commercial salmon fishery with the intent of developing a series of options, based solely on existing biological knowledge and fishing patterns, which could be used to minimize Newfoundland's catch of Canadian salmon of mainland origin. The options might be considered by senior management as best available estimates to aid in selection of an approach to reduce the harvest of non-Newfoundland-origin salmon in Newfoundland.

The Working Group held a total of 7 one-two day meetings between October 1975 and February 1978. At the first meeting, it was immediately obvious that many difficulties lay ahead of the Group because results of tagging studies and data on mainland salmon stocks, on Newfoundland's commercial fisheries, and on the Newfoundland-origin salmon in these fisheries were not compiled in formats suitable to the task. Also, many conceptual problems had to be solved because a suitable model of the Newfoundland commercial salmon fishery had never been developed. A general approach toward a model was set up during the first two meetings and many refinements of different aspects of the model were subsequently introduced.

During its deliberations, the Working Group discovered that large and important data gaps existed in our knowledge of the salmon and the fisheries - thus influencing progress with the assigned task. But, in the interest of developing a complete model, and in the belief that a model incorporating all existing data (with assumptions made where necessary) was better than no model, the Working Group completed its task.

A number of general regulatory approaches was considered, each of which could potentially reduce harvesting of mainland-origin salmon in Newfoundland (Table 1). Because it would be almost impossible to quantify the impact and advisability of all or even a few of these approaches, and after having considered the feasibility of implementation of each, a decision was made to assess that approach which dealt with varying the length of the commercial salmon fishing season (Table 1, Approach 3A).

Selection of this approach necessitated a breakdown of Newfoundland catch statistics by week (Table 2) and by Statistical Area. This selection utilized available knowledge of the spatial and temporal distribution of mainland-origin salmon stocks in each of the fishing areas, as well as information on sea ages, sexual maturity, migration routes, swimming speeds and directions, exploitation rates, mortality rates and a variety of other parameters.

This report outlines the major steps taken to develop a comprehensive model of the fishery and an evaluation of the options examined to minimize harvesting of mainland-origin salmon in Newfoundland's commercial fishery.

THE FISHERY

The average annual catch of Atlantic salmon in Newfoundland during the 1969-1975 period was estimated to be about 3.8 million pounds. Statistics were available by month, except during 1974 and 1975 when weekly breakdowns of catches were also available. In the absence of observations of the effect upon fisheries of annual variations in oceanic distribution of ice along the east coast (Appendix I), adjustments to the weekly distributions (of 1974 and 1975) were made so that catches during the early weeks of the fishery represented that of an "average ice year". A portrayal of adjusted weekly catches during an average year (based on 1969-1975 catches) of the commercial fishery was thus compiled (Figure 1, Appendix II). These catches include estimates of salmon sold locally (i.e., not to fish processing plants) as well as salmon caught in non-salmon fishing gear (e.g., cod traps, herring nets, etc.).

ORIGIN OF SALMON IN THE FISHERY

General

Examination of past tagging studies showed clearly that salmon in the Newfoundland commercial fisheries originated in rivers of Newfoundland and Labrador (Murray, 1968; Pratt, Hare and Murphy, 1974), the Maritime Provinces (Appendix III), Quebec (Appendix V) and Maine (Meister and Bond, 1975). The Maine component in the fishery was apparently small and was not considered in this study, However, it was recognized that action oriented toward mainland-origin stocks in the fishery would also likely affect Maine stocks.

The number of pounds of salmon from each of the contributing areas was determined by a number of approaches, each depending upon the types of data available. Two basic assumptions were made at this stage:

1. All salmon of Newfoundland-Labrador origin pass through Newfoundland-Labrador fisheries, and

2. All salmon of non-Newfoundland origin do not necessarily pass through the Newfoundland-Labrador fisheries.

Overall catches by weight

Estimated total weights of salmon originating in the Maritime Provinces and Quebec (Appendix II) were based on numbers of tags recovered from the Newfoundland and home water fisheries and on mean weights of fish in Newfoundland coastal areas (1SW = 4.50 lbs; 2SW = 9.88 lbs; 3SW = 16.95 lbs). Data from the results of up to 6 years' (1968-1973) tagging of smolts were combined to acquire workable numbers of tags. No adjustment for non-reporting of tags was made for any fishery except in cases when complete counts of tagged and untagged salmon were available from specific river systems (Appendix IX). Catches in Area J were adjusted in the first five weeks (Sections 38 & 39, Appendix II). The estimated weights of Quebec origin salmon* (Appendix V) were added to those of the Maritimes (Appendix II) and this was subtracted from the average catches of the Newfoundland-Labrador fishery for the years 1969-75 to derive the Newfoundland-Labrador component. The final estimate of the composition of the Newfoundland-Labrador commercial fishery as obtained by the above methods was:

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* Stocks from Anticosti, Lower North Shore, and the Angava areas were not included in the Quebec estimates.

Area of origin	Catch (pounds)	Final estimates	Catch (pounds)	First estimates
Newfoundland-Labrador fishery				
Newfoundland & Labrador	2,870,000	75.4%	2,983,000	78.4%
Maritime Provinces	418,000	11.0%	358,000	9.4%
Quebec	517,000	13.6%	441,000	11.6%
	3,805,000	100.0%	3,782,000	99.4%
Labrador fishery				
Newfoundland & Labrador	1,236,000	94.4%	1,195,000	91.2%
Maritime Provinces	28,000	2.1%	31,000	2.4%
Quebec	46,000	3.5%	62,000	4.7%
	1,310,000	100.0%	1,288,000	98.3
Newfoundland fishery				
Newfoundland & Labrador	1,634,000	65.5%	1,823,000	73.1%
Maritime Provinces	390,000	15.6%	322,000	12.9%
Quebec	470,000	18.9%	264,000	10.6%
	2,494,000	100.0%	2,409,000	96.6%

In the absence of suitable tagging data for Newfoundland-Labrador stocks, an independent estimate of the number of pounds of Newfoundland-origin salmon in the fishery was derived (Appendix IV) through analysis of (a) smolt production figures coupled with natural and fishing mortality at sea (Appendix VII), and (b) angling data from the recreational fisheries coupled with estimates of natural and fishing mortalities (Appendix VIII). These independent estimates of the proportions of Newfoundland-Labrador origin salmon in the catches are presented in the above text-table and in support of the final estimates used. The first estimates of the catch of Maritimes and Quebec origin salmon in the fishery were based on tag returns as in the final estimates, but no adjustments were made for the impacts of seasonal ice conditions or non-reporting of tags in Area J.

Catches by Area

Data from the Maritimes and Quebec tagging experiments indicated that salmon stocks from the mainland had uneven spatial and temporal distribution in the various commercial fishing areas. Therefore, the tagging data were broken down by Area and the number of pounds caught in each of the Statistical Areas A-0 was estimated (Appendix X). Those pounds of salmon not accounted for by the estimated Maritimes and Quebec components were assumed to be of Newfoundland-Labrador origin (see final estimates in text table above, Appendix IX, and Fig. 2(a), (b) and (c).

Results of these analyses indicated that relatively few pounds of mainland-origin salmon were taken in some Areas (for example, those Areas on the west coast of the island). In other Areas proportions of mainland-origin salmon varied between 6 and 51%. Areas C and E were found to have the highest proportions of mainland-origin salmon; 51% and 48% respectively (Fig. 2).

Catches by week

Further analysis of the tagging data provided an estimate of the pounds of Maritimes and Quebec-origin salmon taken during each week of the season in each of the Statistical Areas (Appendix IX, X and XI). These analyses revealed that salmon from a given river system or area were not distributed evenly throughout the fishing season in any given Statistical Area. In some weeks, relatively high proportions of salmon from a given area or system were present in a fishery.

GENERAL BIOLOGICAL CONSIDERATIONS

It was realized that elimination of a fishery for a given week would not necessarily ensure that fish thus released would reach their river of origin. A number of basic questions had to be considered:

1. If a given fish was not caught in a Statistical Area during a particular week, was there sufficient time for it to swim from that Area to its river or area of origin prior to time of spawning during the current year? Would it remain at sea for another year(s) before possibly returning to the Newfoundland fishery area en route to its spawning grounds? This question implied that the migration patterns and swimming speed of the fish had to be considered.

2. What are the exploitation rates on the stocks present in the various Statistical Areas and how will component stocks be affected by modifications in these rates?

3. What proportion of the salmon not caught in one Area (as a result of fishing restrictions) will escape fisheries in other Areas and survive to spawn in the same year?

Migration patterns

Detailed examinations of marine and freshwater tagging experiments suggested highly complex migration patterns for the different stocks of salmon in Newfoundland's coastal fishing areas. It might have been speculated that the bulk of the salmon approached the coast at a certain place and moved *en masse* along the coast toward their rivers of origin. While such directional movement may exist for individual fish which are destined to spawn in that particular year, there is little evidence that salmon follow this "coasting" pattern *en masse*. Evidence was found that salmon from specific areas (in Quebec) tend to approach particular parts of the coast and migrate as rather loose groups but there was insufficient evidence available to test whether this migratory pattern existed for salmon from all areas.

Available tagging data indicate both a general clockwise and some counter-clockwise movement along the island's coast, as well as both an inshore migration for some groups of salmon (presumably toward their rivers to spawn or to coastal feeding areas) and suggests an offshore migration for other groups (into the Labrador Sea) (Fig. 3).

Swimming speed

Analysis of results of marine tagging experiments led to acceptance of an estimated average swimming speed of 20 miles per day Appendix XII. This estimate was used to decide if fish in a given coastal area had sufficient time to migrate back to their rivers of origin prior to end of normal upstream spawning migration in that year. If so, such fish were assumed to be maturing and migrating home; if not, they were assumed to be on a feeding migration which would take them through at least part of the current year's fishing, out into the Labrador Sea, and possibly to Greenland before returning to the Newfoundland fishing area or home waters (as larger fish) (Fig. 4).

Marine life patterns

In addition to migration patterns and swimming speeds, general marine life history was considered for component river stocks. Some stocks were relatively simple because most salmon returned to the rivers as grilse. Others had large components which returned as 2-sea-winter salmon and which could possibly have been through Newfoundland's coastal fishing areas during zero, one or two seasons and through the West Greenland fishing area once. Salmon stocks which return to spawn after 3 winters at sea have an even more complex pattern. The variety of marine life patterns (Fig. 4) coupled with associated differences in fishing mortality, natural mortality, and the continuous growth of the salmon at sea greatly complicated determinations of effects of fishing closures on given stocks of fish and on the resultant effect of fishing restrictions on the fisheries. Nevertheless, numerous calculations based on these possibilities were performed on specific stocks of salmon from both the Maritimes and Quebec, and a method to accommodate these complications and their effects on different stocks of salmon was agreed upon (Appendix IX).

DEVELOPMENT OF REGULATORY OPTIONS

Only after each of the above factors was taken into account was it feasible to determine the effects of specific weekly closures on component stocks in the coastal fishery. A number of possible regulatory options were considered (Table 3), each of which affected different component stocks in different ways, i.e., while one option favours a number of Quebec-origin salmon stocks, another favours specific Maritimes-origin salmon stocks to a greater extent. It was decided to assess the merits of each option separately.

In considering each option, the Group had to take into account that implementation of an option would alter the fishing pattern in the fishery and thus alter fishing mortality. Thus, effects were determined for the period after implementation of fishing restrictions rather than during the initial (1st three years) of implementation.

The Group recognized that some salmon released from the fishery which were not destined to spawn in that year would die from natural mortality and others could return to the Newfoundland fishery in the following year. Those fish which survived the additional year at sea would increase in weight and thereby contribute more individually to the fishery in the second (or third) year at sea, thereby often negating the effect of natural mortality. This compensating effect was the case for many salmon of mainland-origin, and, it was determined in most, but not all, of the options that the gain in weight of Maritimes and Quebec-origin salmon released toward the mainland exceeded the reduction of the Maritimes and Quebec-origin salmon from Newfoundland's commercial fishery (Appendix XIII and XIV).

The Group also recognized that a portion of Newfoundland-origin salmon released in any given Area by any of the options would be caught later in other areas; the remainder could enter their rivers of origin. The estimate of the proportion of Newfoundland-origin salmon escaping the fisheries to enter these rivers is highly subjective because of the almost complete lack of data on movements, timing, and mixtures of Newfoundland-origin salmon in the Newfoundland fisheries. Nevertheless, estimates were developed of the number of Newfoundland-origin salmon which may escape the traditional commercial fisheries as a result of implementation of any particular option. Some of these would be harvested in the recreational fisheries, some could fill spawner deficits, while the remainder would be available for commercial harvest in or near the river system (Appendix XV).

Finally, estimates were made of the total weight and number of salmon from all areas of origin to be deducted from the Newfoundland commercial fishery assuming no re-deployment of fishing effort, and of the specific weight and number of salmon potentially returning to the mainland (Appendices IX, XIII and XIV) or to Newfoundland-Labrador rivers (Appendix XV) should any of the options be implemented. The Group did not consider how or where these returning salmon would be harvested.

CONCLUSIONS

Summaries of the estimated losses to the Newfoundland commercial fisheries under present harvesting regimes and gains to Maritimes and Quebec areas resulting from the imposition of each of the regulatory options considered are presented in Appendices XIII, XIV and XV. Also, graphic representations of the number of pounds and weeks affected in each of six options dealing with season adjustments are presented in Fig. 5-10. The reader should note that the weight of catch indicated as "affected" in these figures does not reflect an estimated "reduction" in catch in any particular Area. This fact is because fish released from one Area, as a result of fishing closure, may migrate to other Areas and be caught there. For example, about 40,000 pounds of salmon in Area C are affected in Week 6 of Option 1B, but many of these salmon will migrate into Area D and be harvested in Week 7. Similarly, catches in most

Areas from Week 7 onwards would be greater than those indicated in Fig. 1. In this way, implementation of any of the options would change the distribution of the catch in the fishery from that indicated in Fig. 1-2c.

Pounds and numbers of salmon estimated to be reallocated to different fisheries as a result of full implementation of each of the options are presented in Tables 4-10. A number of important considerations should be kept in mind when examining these tables:

1. "Salmon to Maritimes" indicate Maritimes-origin salmon released from the Newfoundland commercial fisheries which will be available for either harvest or rebuilding of stocks in the Maritime Provinces.

2. "Salmon toward Quebec" indicate Quebec-origin salmon released from the Newfoundland commercial fisheries and which are en route to rivers in Quebec. Some of these may be caught in the mixed stock fisheries in New Brunswick or P.E.I. while others may avoid those fishing areas. Those not harvested in New Brunswick or P.E.I. would be available for harvest or rebuilding of stocks in Quebec.

3. "Salmon to Newfoundland sport fishery" is an estimate of those salmon released from the Newfoundland commercial fishery and later caught in Newfoundland's sport fishery. In developing this estimate it was assumed that angling effort would not increase after implementation of changes in the commercial fishery. However, it was suspected that angling effort would indeed increase, but estimates of the magnitude of the increase could not be made.

4. "Salmon available for a modified Newfoundland commercial fishery" are those salmon estimated to be released from the traditional commercial fisheries by the implementation of any particular option. The estimates do not include those salmon which would be caught in the Newfoundland sport fishery. Although knowledge is available on the location of salmon rivers, the identity of particular rivers to which particular released fish are headed is not known. Thus, it is not now possible to recommend in more than general detail how to achieve the harvest of these salmon, although some adjustment to commercial fisheries is technically possible. Fishing plants for the harvest of these fish in their home river estuaries will therefore have to be developed in time as biologists are able to assess the impacts of regulatory changes on each stock having recreational harvest capability.

In Table 11, the increases of mainland-origin fish in mainland fisheries (or conservation programs) are related to reductions of salmon catches in the Newfoundland commercial fishery. The weight gain to loss ratio varied from 1:1.7 to 1:2.2; the former means that for every 1.7 pounds of salmon reduced from the Newfoundland commercial fishery, 1 pound reaches mainland fisheries or conservation programs. Similarly, with respect to numbers of salmon, the ratio varied from 1:2.5 to 1:3.4. These ratios represent overall averages and are not necessarily applicable to any given stock of salmon (see Appendix XII).

An alternative way of presenting the impacts of the various options is to assume that all salmon affected by new regulatory options are caught elsewhere and then compare total yields to all potential fisheries. As indicated earlier, the effects of natural mortality between the Newfoundland fishery and home waters is often negated by weight gain during the same period. The ratio of the total weight gain to all potential fisheries to the total loss to Newfoundland's commercial fishery was about 1:1 for all options, although the latter fishery can be modified to capture only a portion of the Newfoundland salmon released by these options. With respect to numbers of salmon, when a growth factor is not included in the calculations, all total gain ratios were less than 1: 1. These ratios would be reduced by the ability to harvest only a portion of these Newfoundland origin salmon.

The seven options were ranked according to several different objectives, or scenarios (Table 12) and the rank order did not change drastically when numbers rather than weight of salmon were considered.

The reader should note that the timing of migraton of salmon in the Newfoundland fishery varies from year to year and that the weekly catch distribution outlined in Figure 1 is an average situation. In fact, it is unlikely that any given year would have fisheries exactly like those of Figure 1. Thus, implementation of any one of the options would have effects which varied from year to year; illustration of the weeks affected for each of these options in 1975 is presented in Figures 11-16.

The estimated impacts shown here are applicable only after three years of full implementation of each of the options. This is because not all fish released from Newfoundland's commercial fishery, as a result of a first year of implementation, are lost to that fishery. Some fish will remain at sea and survive to enter the fishing area the next year. Similarly, of these fish which enter the fishing area a second time, some may survive into a third season.

In addition to the above, there are two important factors which significantly affect application of the conclusions of this report. The first is that in the calculations of the effects of the options it was assumed that all salmon harvested were harvested in licensed salmon gear. Future incorporation of reliable data on catches of salmon in non-salmon gear may be complicated by the anticipated continuing reduction of salmon by-catches in non-salmon gear. The second, and more important, factor is the assumption that the numbers of commercial fishing licenses would remain constant. New effort figures available on an Area by Area basis will require adjustment of the impacts of the options.

FUTURE RESEARCH REQUIREMENTS

Evaluation of each of the options were based on available data and the best estimates or "quesstimates" of important parameters; thus confidence limits could not be calculated around the results. Future similar analyses will require extensive research in the following areas.

1. The use of salmon scale characteristics as a means of directly determining the proportions of salmon of different areas of Canada.

2. The use of biochemical analysis as a means of directly determining the proportions of salmon destined to spawn in a given year.

3. Stock composition in each Statistical Area on a week-by-week basis.

4. Annual variations in migratory patterns of stocks contributing to each Statistical Area.

5. Marine survival rates.

6. Rates of non-catch fishing mortality.

7. Fishing mortality rates.

8. Stock assessments on individual stocks to enable discrete stock harvesting.

9. Causes of annual variations in fishing patterns in the Statistical Areas.

10. Effects of varying catches at West Greenland.

11. Spatial and temporal variations in freshwater production rates.

12. Effects of varying ice conditions on salmon migratory patterns and fisheries.

13. Mesh selectivity factors.

14. Maturity of salmon at sea.

NOTE: Location of Detailed Proceedings of Sessions

A copy of the minutes, discussion, documents, handouts, and miscellaneous notes relating to the proceedings of the delibertiions of the Working Group have been deposited in The Regional Library, Department of Fisheries and Oceans, St. John's, Newfoundland.

Literature Cited

(Additional references used in the preparation of this report are given in the appropriate appendices.)

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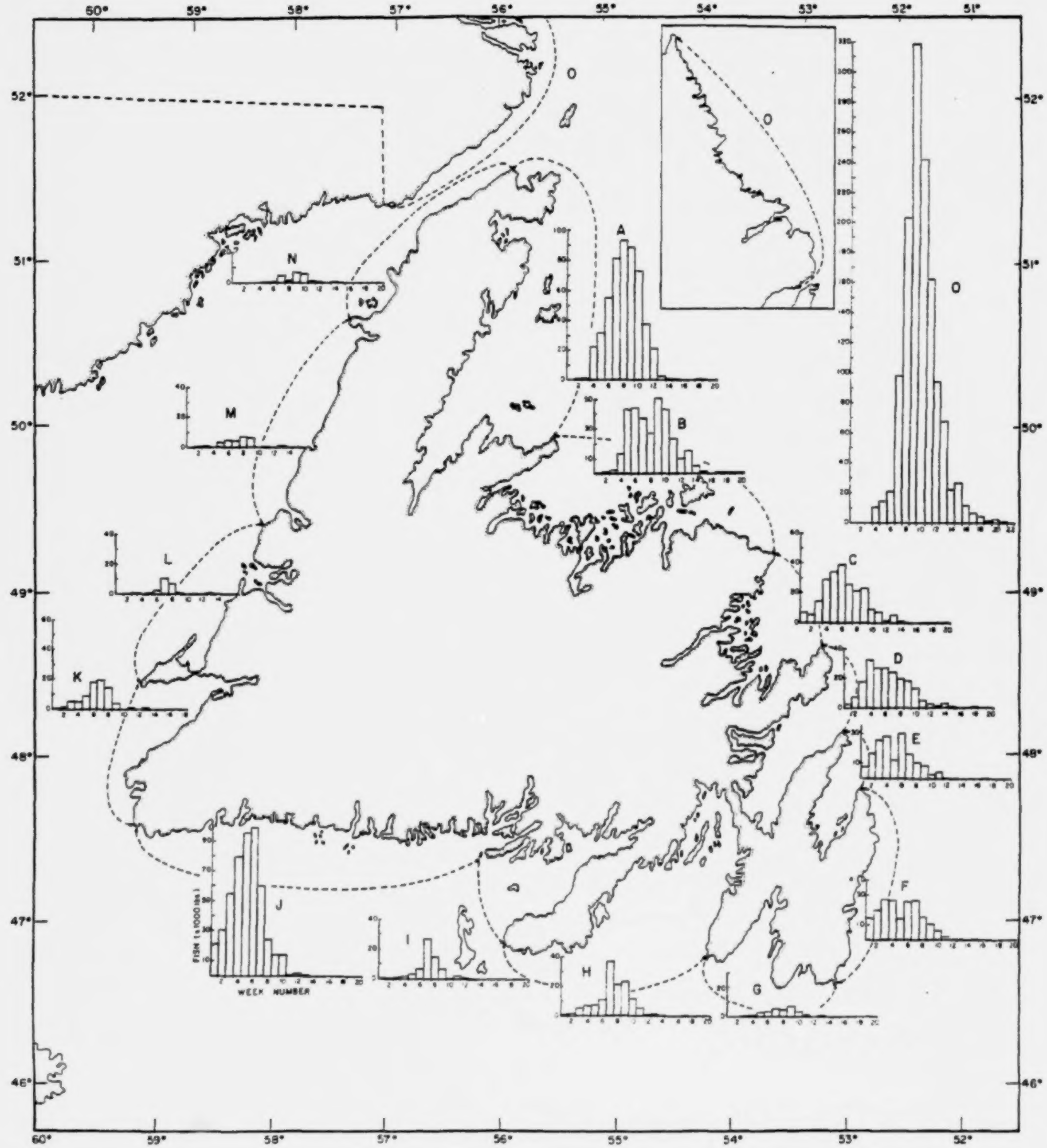
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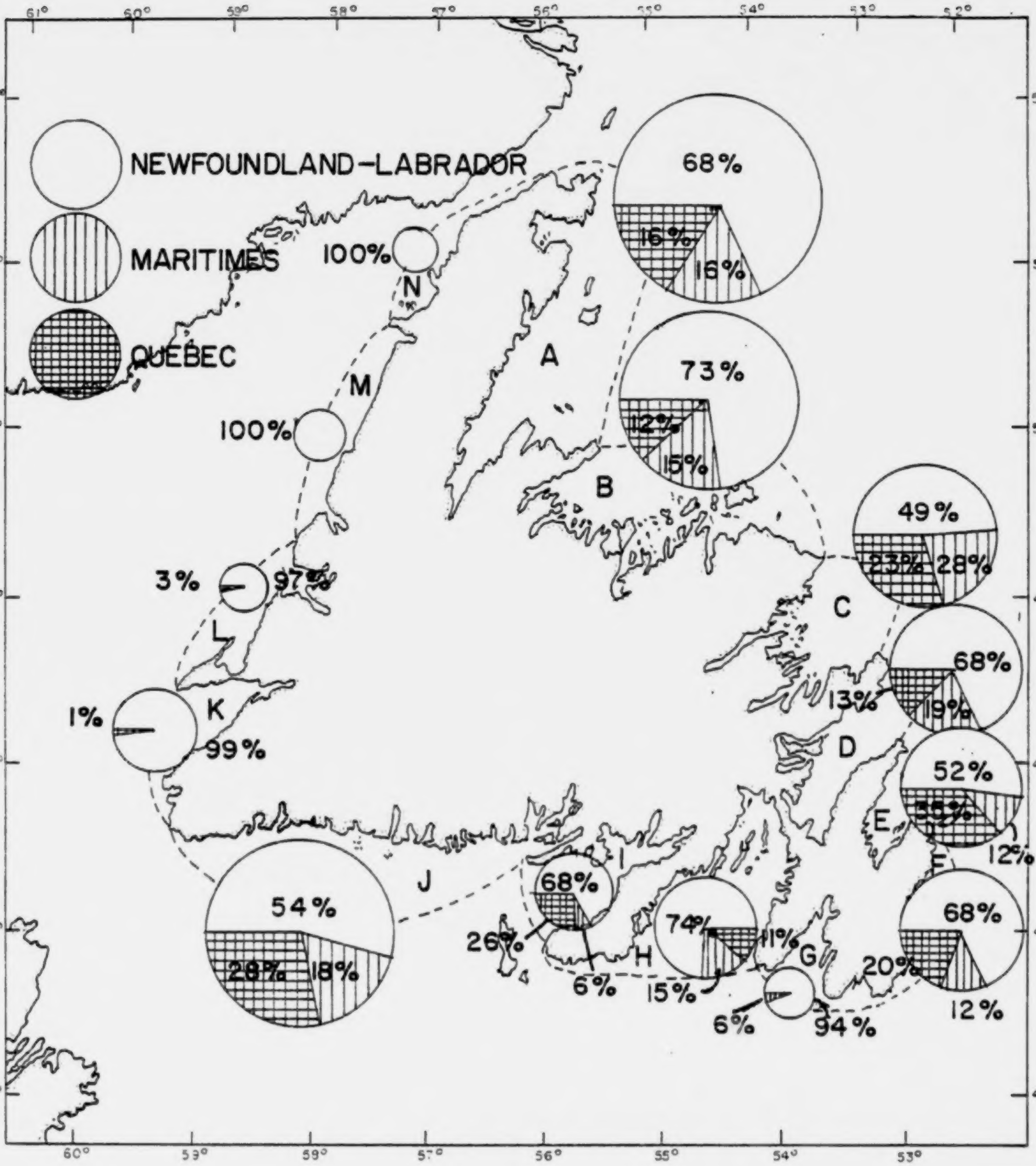
Figure 1. Weekly distribution (in pounds) of Atlantic salmon caught in Statistical Areas A to O. (Total poundages based on data from 1969 to 1975. Weekly distributions based on data from 1974 and 1975 with the early part of the catch in some areas adjusted to resemble a "typical catch" in a "normal" ice year.)


NEWFOUNDLAND-LABRADOR
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16%
16%
73%
12%
15%
49%
23%
28%
68%
13%
19%
52%
12%
68%
20%
12%
94%
6%
74%
11%
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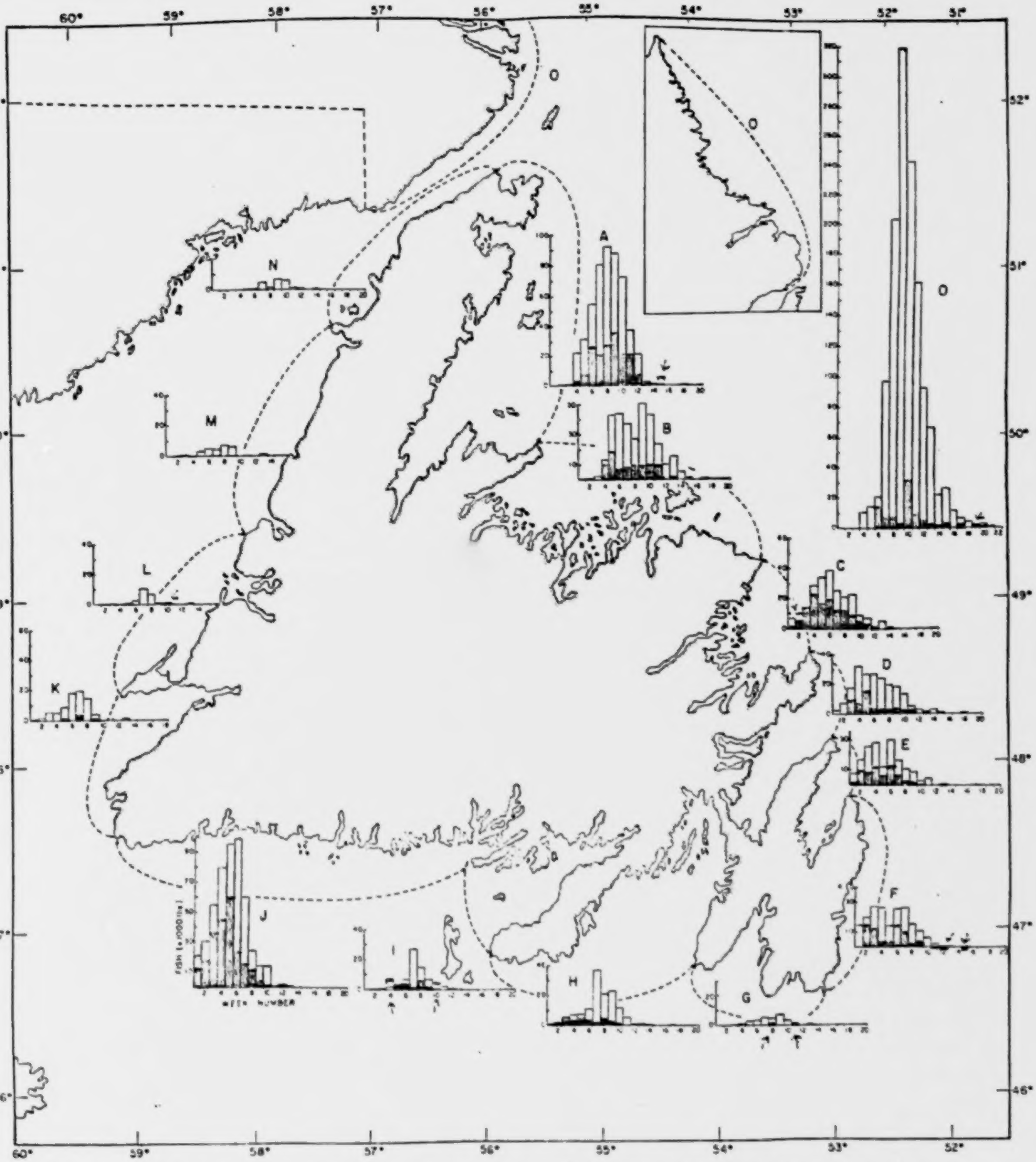
Figure 2a. Percentage, Maritime and Quebec origin salmon in commercial salmon landings in each statistical area of Newfoundland. Labrador landings were estimated to be composed of 94% Newfoundland-Labrador, 4% Quebec, and 2% Maritimes origin salmon.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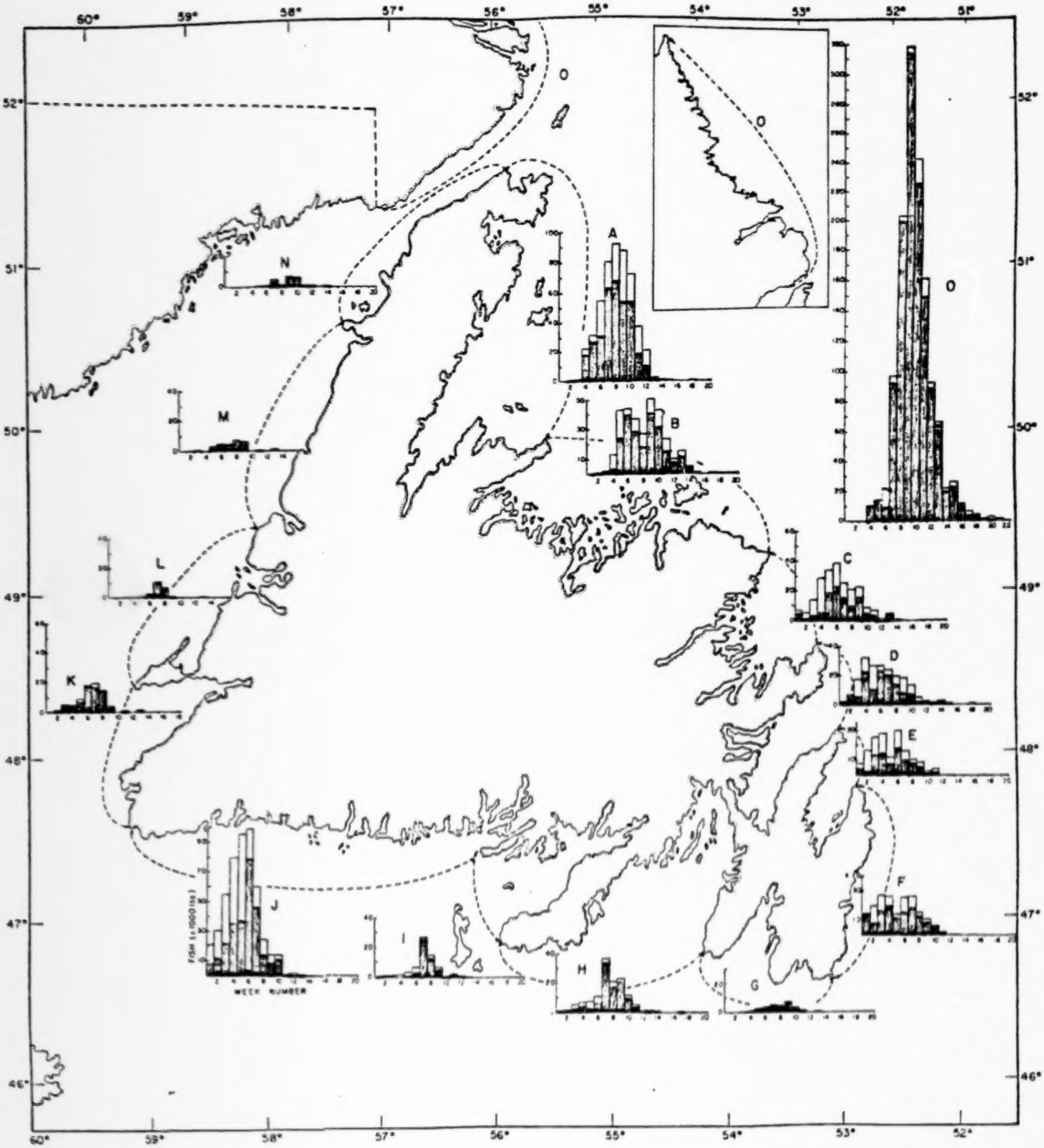
FISH (x 1000 lbs)
WEEK NUMBER

Figure 2b. Maritimes and Quebec-origin salmon (shaded areas) estimated to be present in the Newfoundland-Labrador commercial salmon fisheries during a "typical" fishing season.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WEEK NUMBER

Figure 2c. Newfoundland-Labrador-origin salmon (shaded areas) estimated to be present in the Newfoundland-Labrador commercial fisheries during a "typical" fishing season.

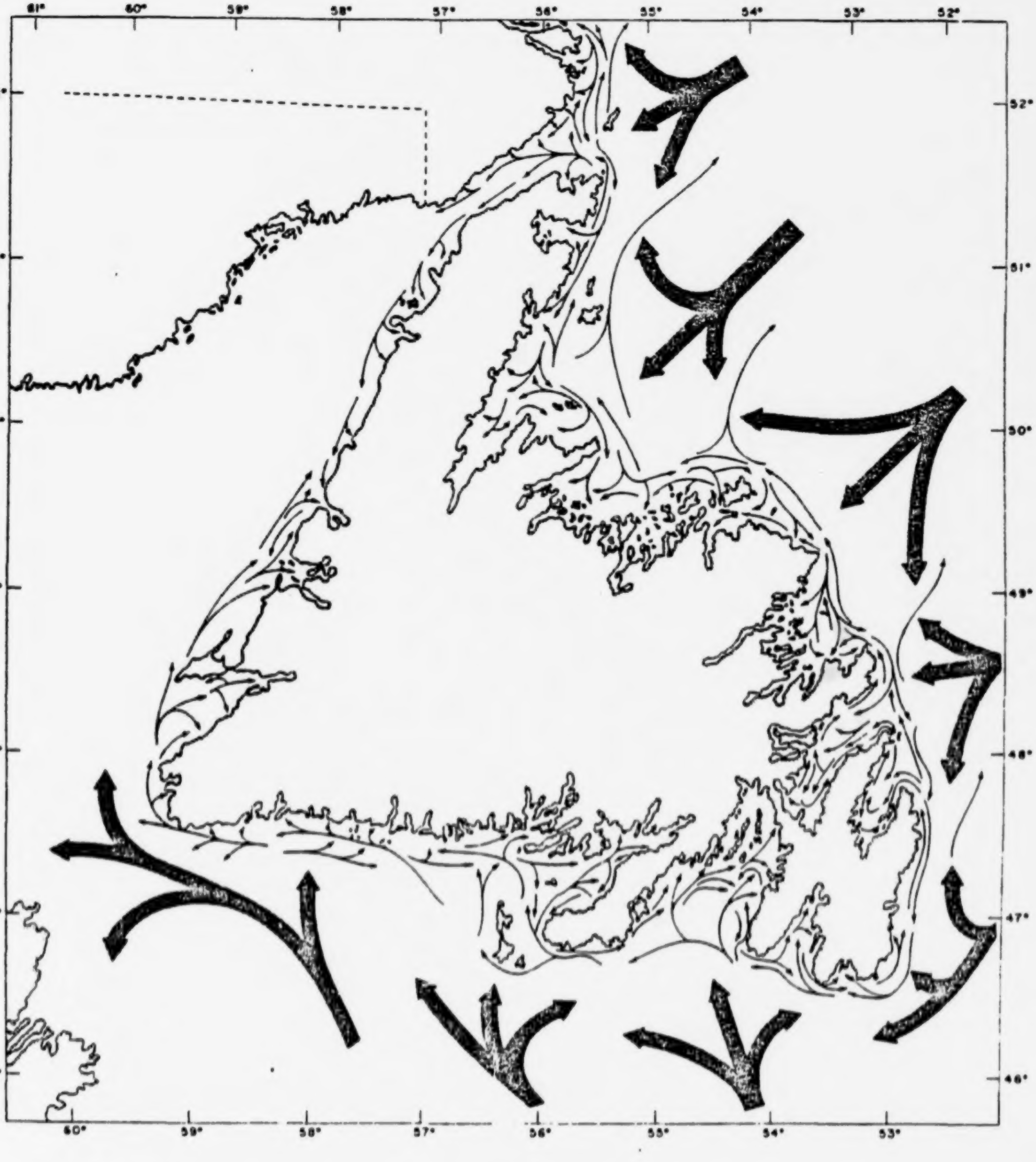
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Figure 3. Movements of salmon in Newfoundland's coastal waters. This map does not show the main migration routes of specific stocks of salmon in these waters but rather a combination of many different migratory patterns. Movements of kelts, particularly along the west coast, are not necessarily depicted.

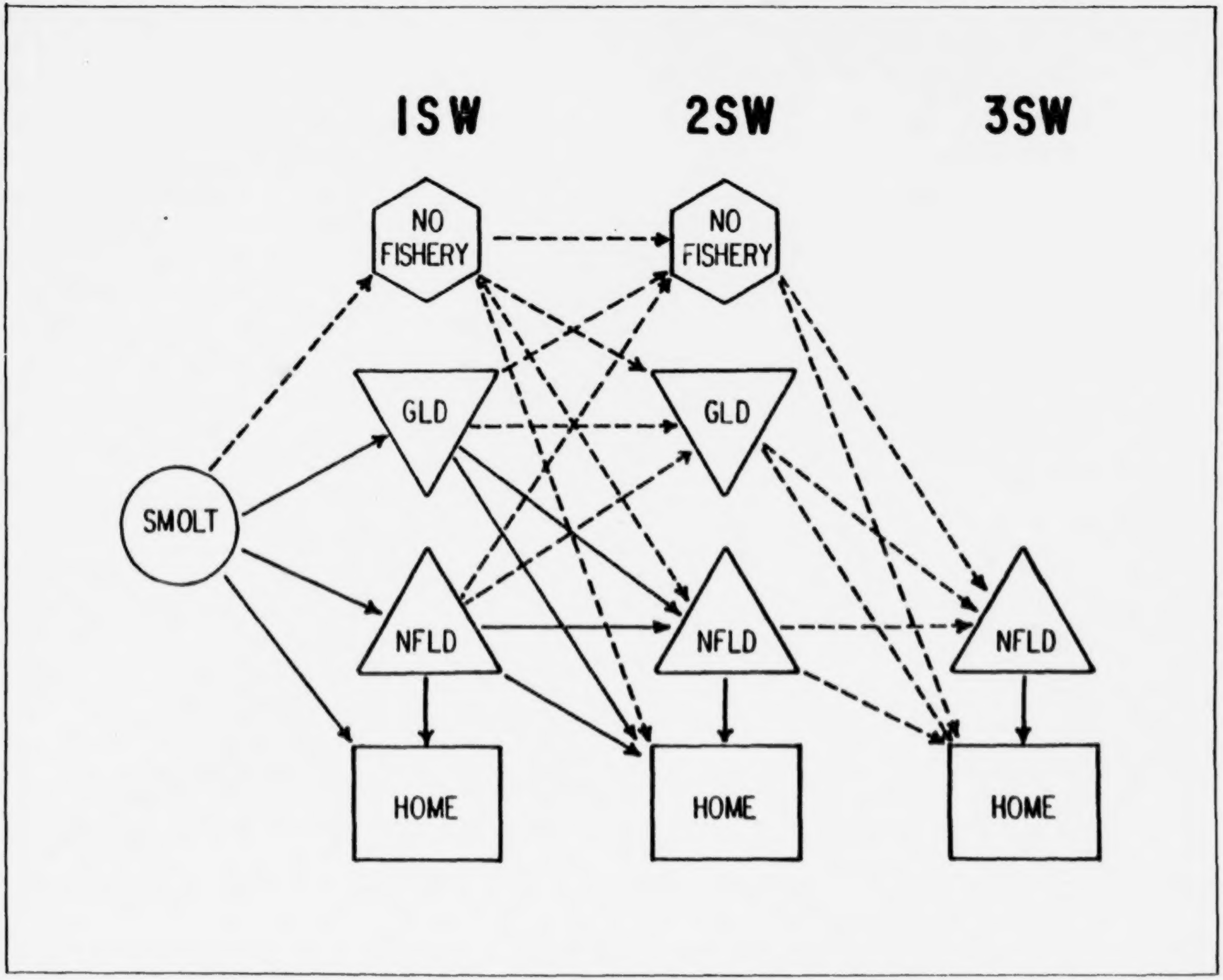
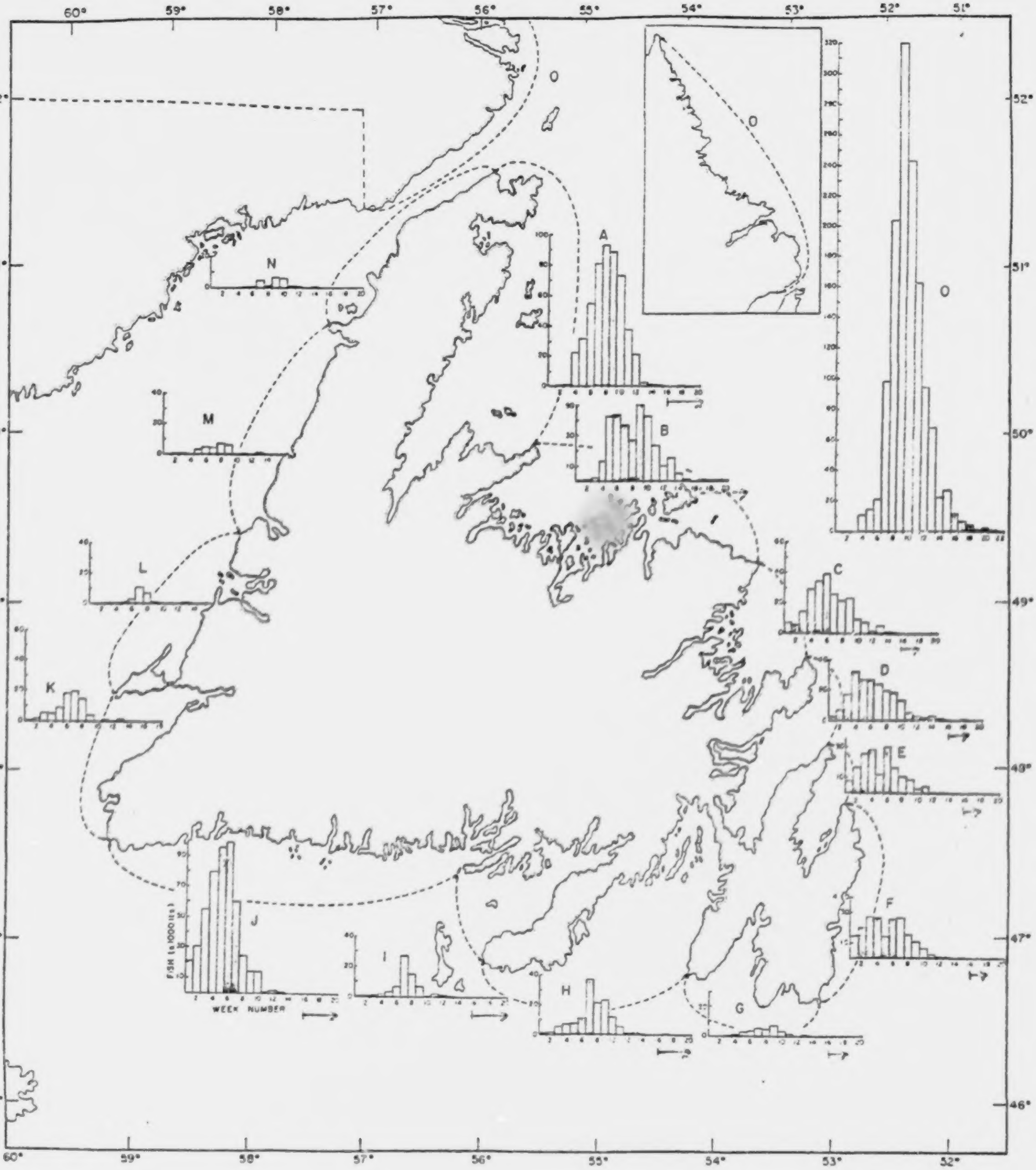

1SW
2SW
3SW
NO FISHERY
NO FISHERY
GLD
GLD
SMOLT
NFLD
NFLD
NFLD
HOME
HOME
HOME

Figure 4. Diagram illustrating variety of possible marine life patterns and their relationship to various fisheries (GLD = West Greenland fishery, NFLD = Newfoundland commercial fishery, HOME represents the area in which the river or origin is located; solid lines represent postulations supported by tagging studies, dotted lines represent postulations considered likely by the Working Group.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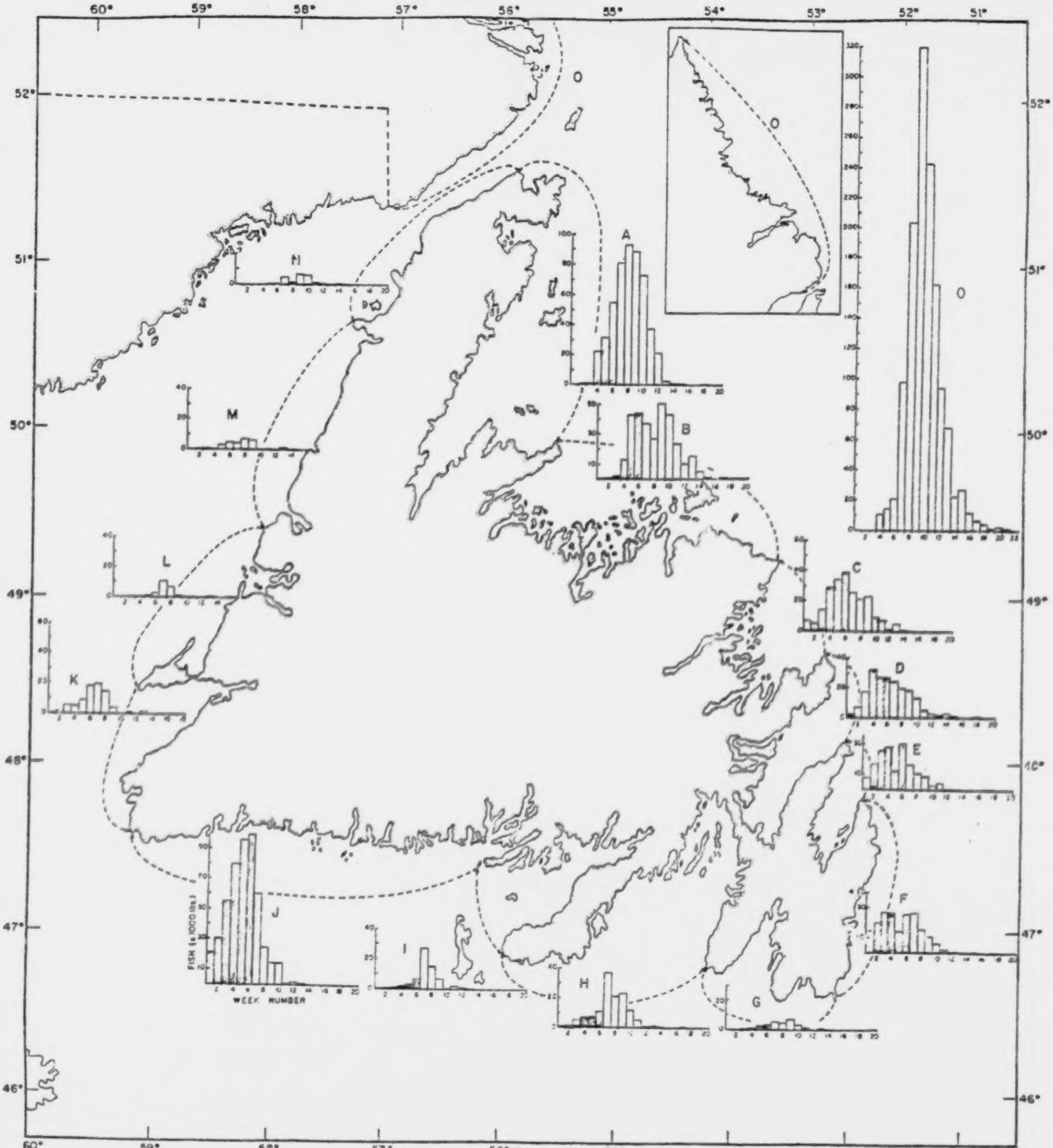
FISH (x 1000 lbs)
WEEK NUMBER

OPTION 1B

Figure 5. Fisheries and weeks that will be affected if Option 1B is implemented. It would be noted that some salmon released during the restricted periods (shaded areas) would be taken later in the fishery, either in the same or other areas.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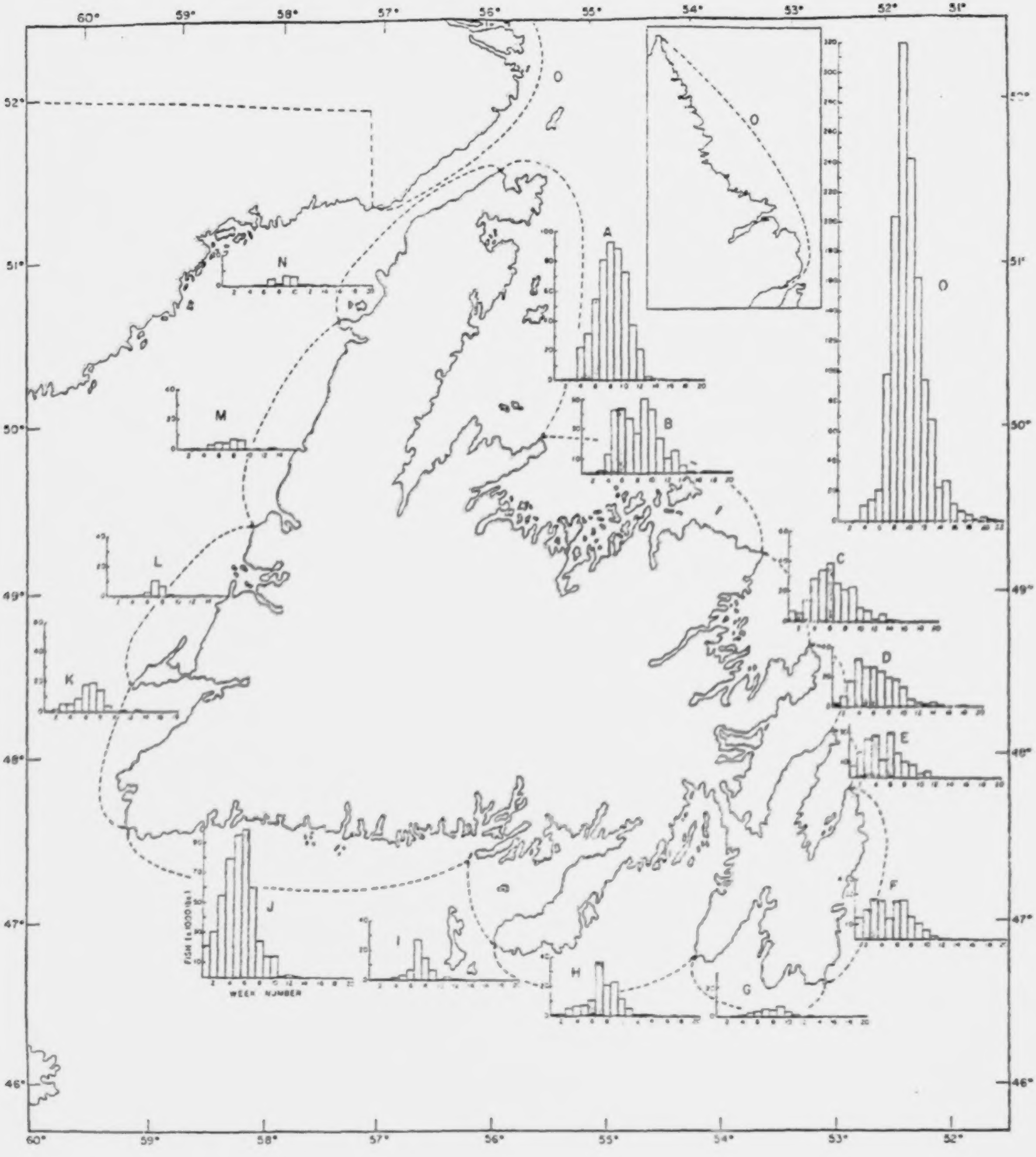
FISH (x 1000 lbs.)
WEEK NUMBER

OPTION 2A

Figure 6. Fisheries and weeks that will be affected if Option 2A is implemented. It should be noted that some salmon released during the restricted periods (shaded areas) would be taken later in the fishery, either in the same or other areas.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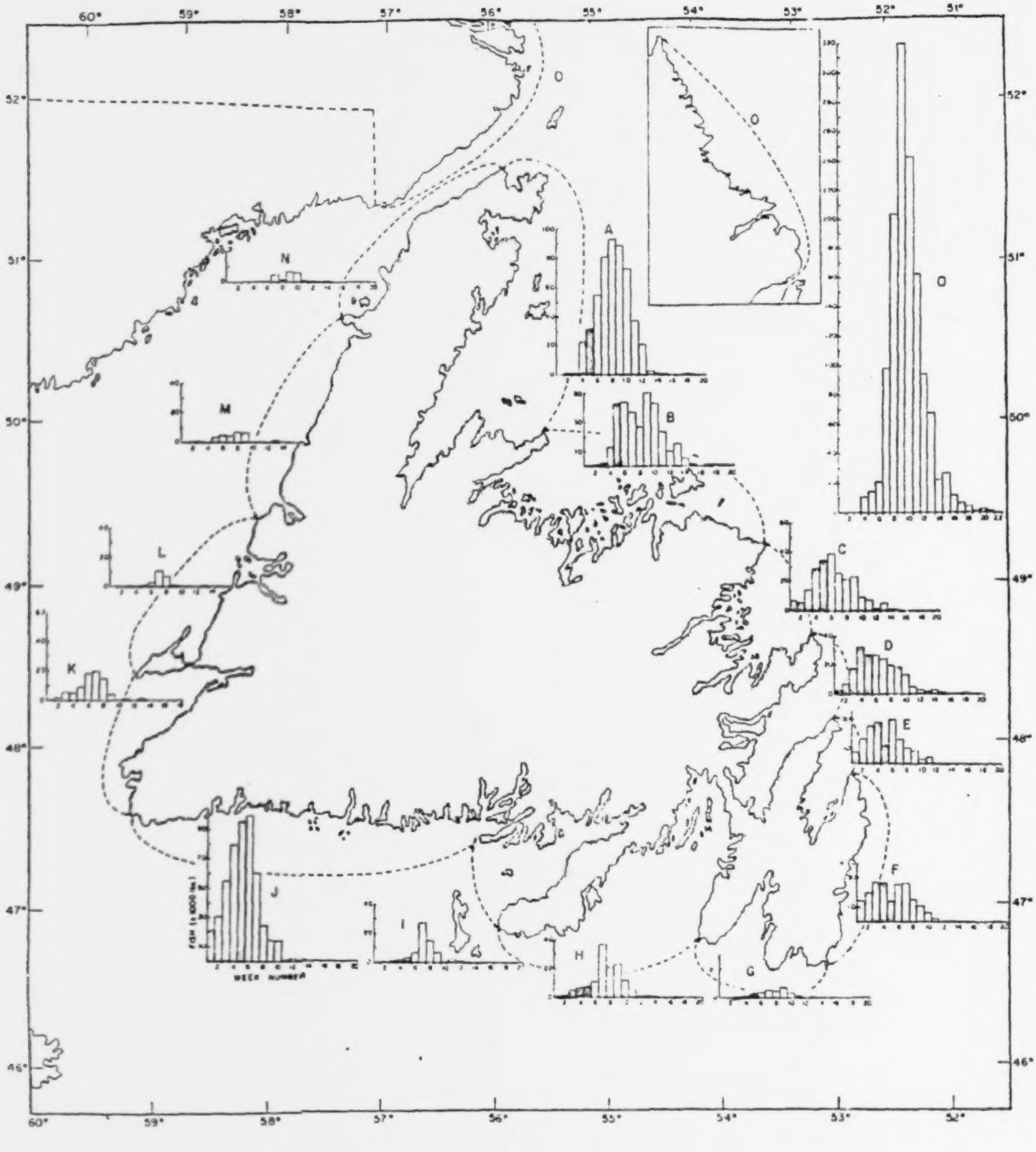
FISH (x1000 lbs)
WEEK NUMBER

OPTION 2B

Figure 7. Fisheries and weeks that will be affected if Option 2B is implemented. It should be noted that some salmon released during the restricted periods (shaded areas) would be taken later in the fishery, either in the same or other areas.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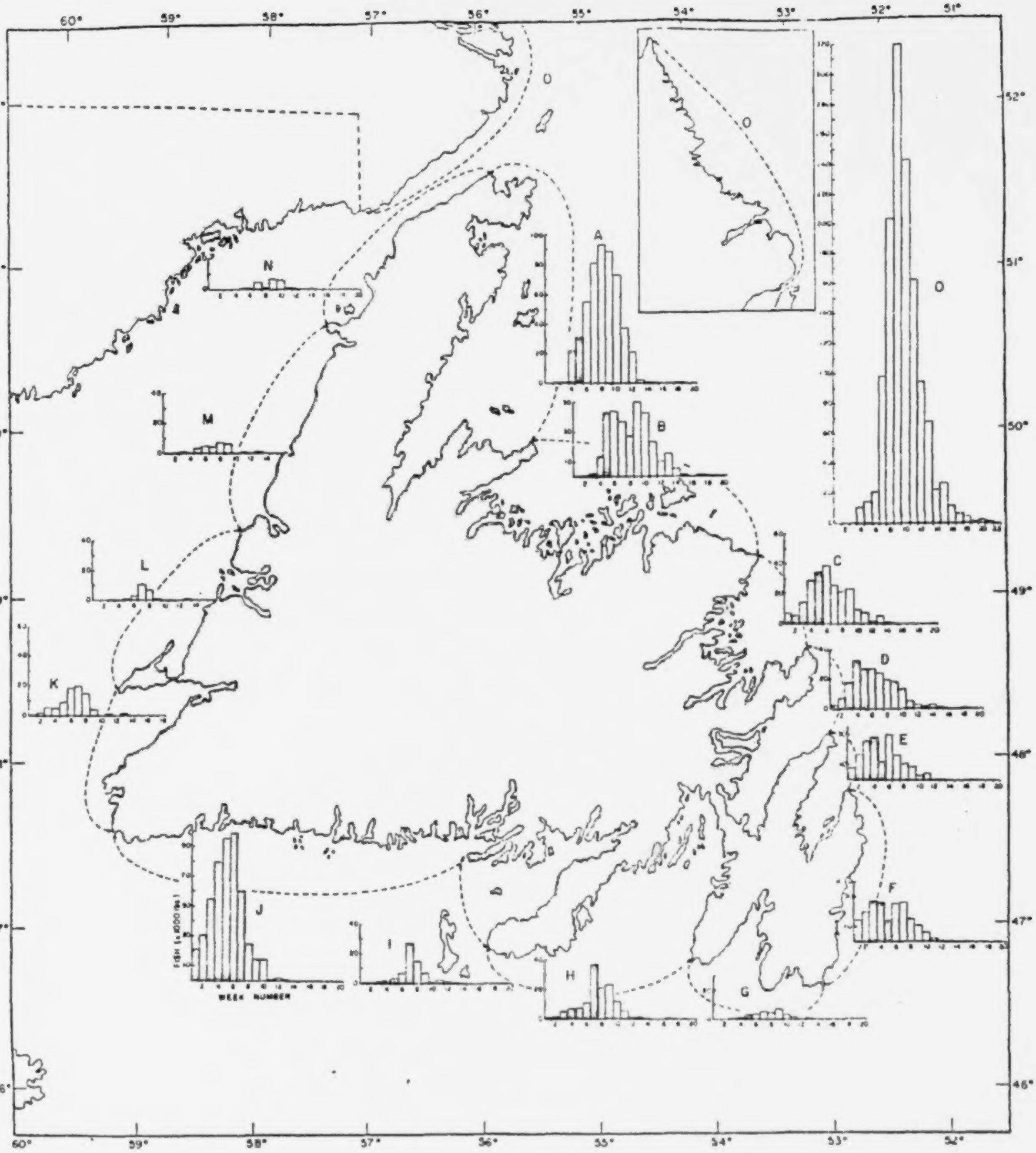
FISH (x1000 lbs)
WEEK NUMBER

OPTION 3A

Figure 8. Fisheries and weeks that will be affected if Option 3A is implemented. It should be noted that some salmon released during the restricted periods (shaded areas) would be taken later in the fishery, either in the same or other areas.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FISH (x1000 lb)
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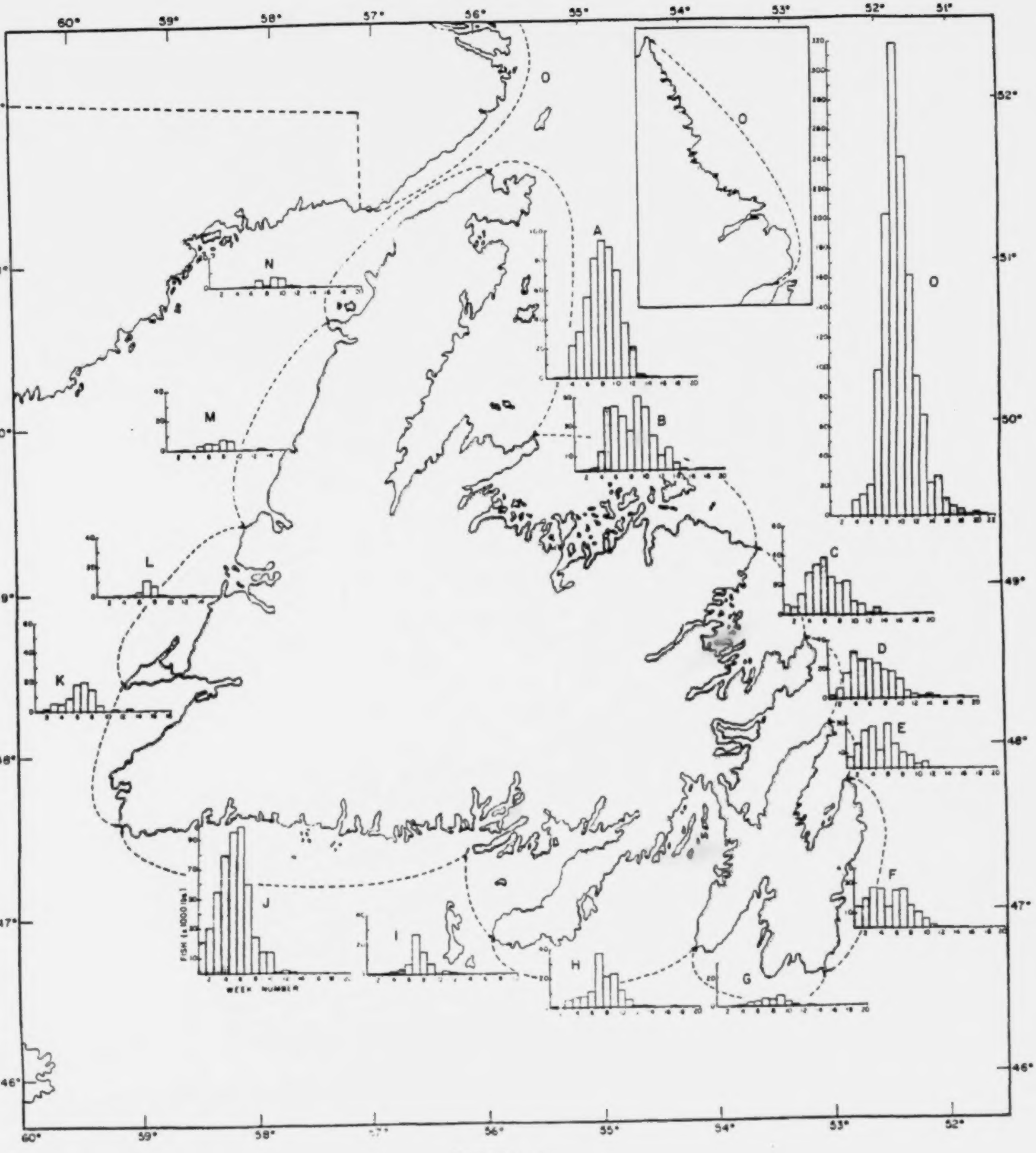
OPTION 3B

Figure 9. Fisheries and weeks that will be affected if Option 3B is implemented. It should be noted that some salmon released during the restricted periods (shaded areas) would be taken later in the fishery, either in the same or other areas.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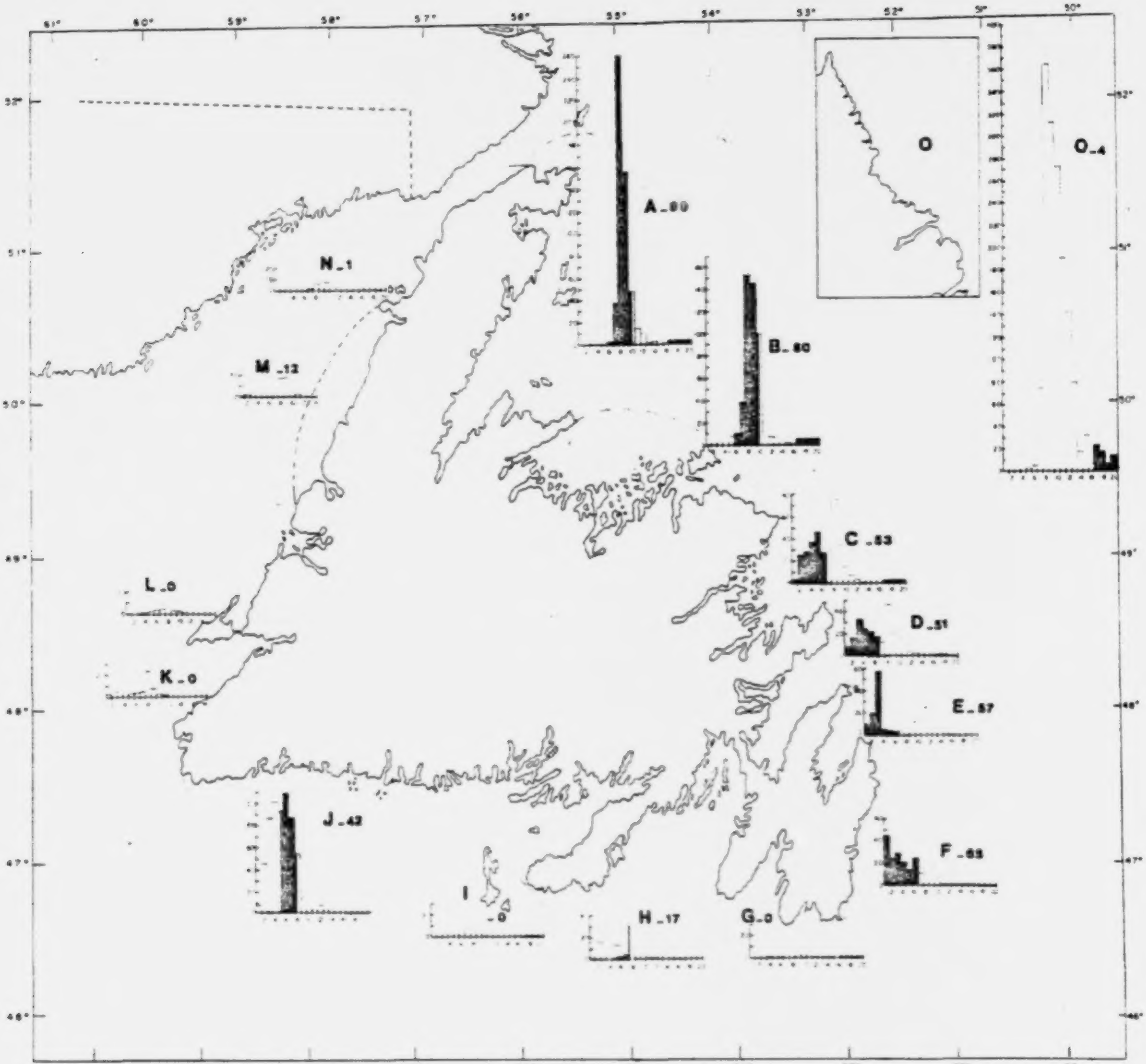
FISH (×1000 lbs)
WEEK NUMBER

OPTION Q

Figure 10. Fisheries and weeks that will be affected if Option Q is implemented. It should be noted that some salmon released during the restricted periods (shaded areas) would be taken later in the fishery, either in the same or other areas.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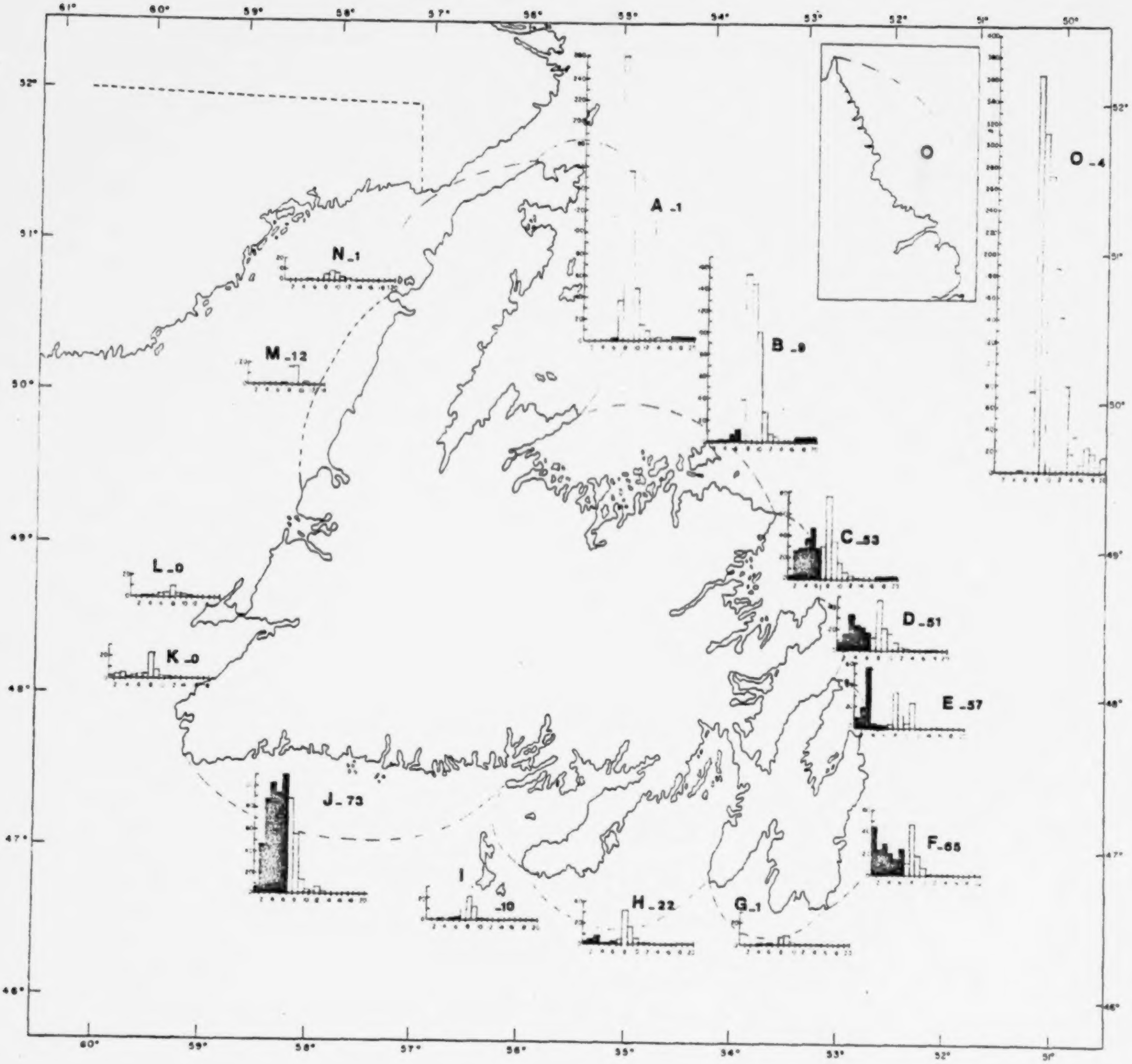
B _80
C _53
D _51
E _57
F _63
G _0
H _17
I _0
J _42
K _0
L _0
M _12
N _1
O
O _4

Figure 11.

Fisheries and weeks that would have been affected in 1975 had option 1B been implemented in that year. It should be noted that some salmon released during the restricted periods (shaded areas) would have been taken later in the fishery, either in the same or other areas.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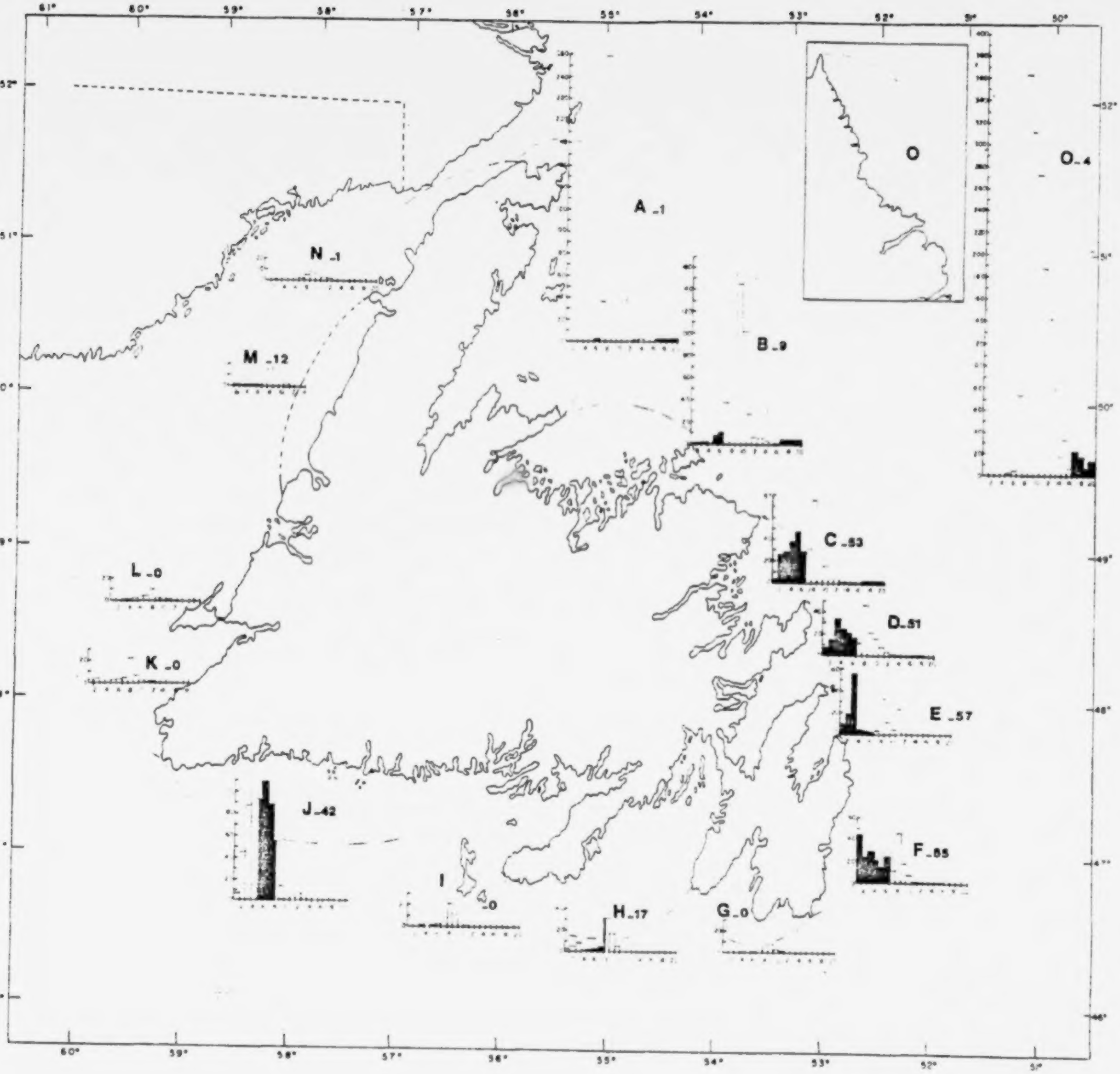
B -9
C -53
D -51
E -57
F -65
G -1
H -22
I -10
J -73
K -0
L -0
M -12
N -1
O -4

Figure 12.

Fisheries and weeks that would have been affected in 1975 had option 2A been implemented in that year. It should be noted that some salmon released during the restricted periods (shaded areas) would have been taken later in the fishery, either in the same or other areas.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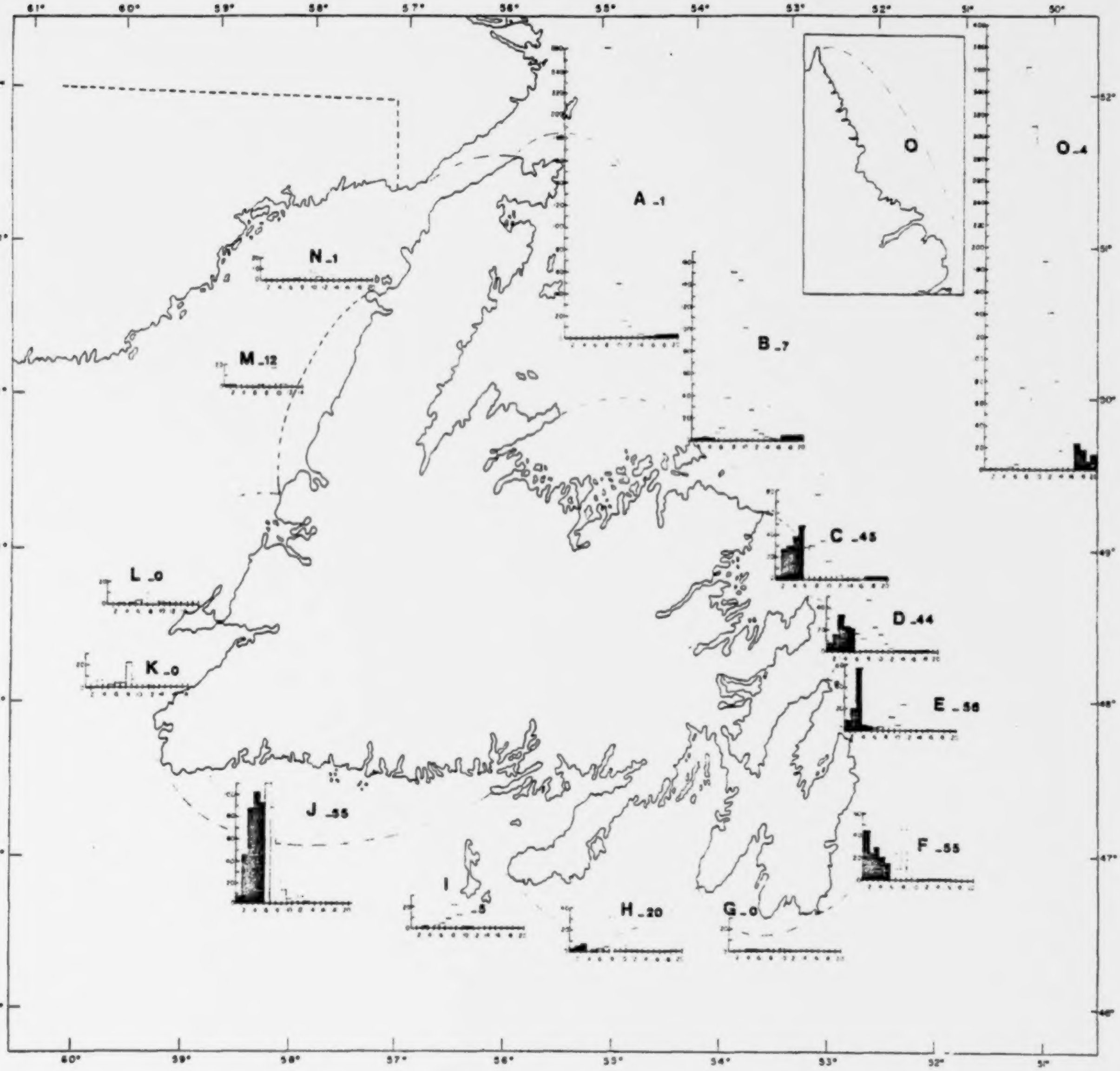
D -51
E -57
F -65
G -0
H -17
I -0
J -42
K -0
L -0
M -12
N -1
O
O -4

Figure 13.

Fisheries and weeks that would have been affected in 1975 had option 2B been implemented in that year. It should be noted that some salmon released during the restricted periods (shaded areas) would have been taken later in the fishery, either in the same or other areas.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C _45
D _44
E _56
F _55
G _0
H _20
I _5
J _55
K _0
L _0
M _12
N _1
O _4
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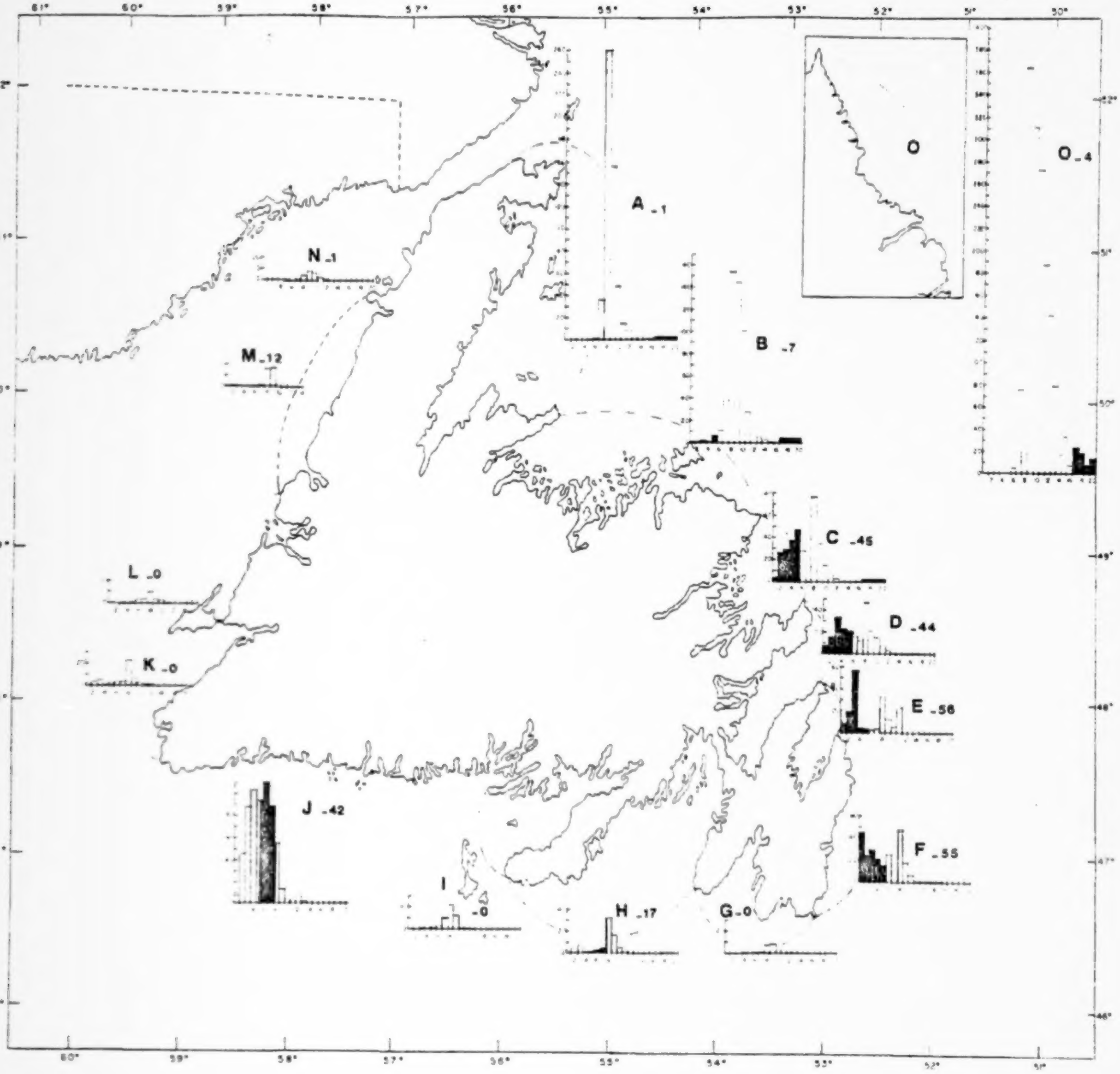
Figure 14.

Fisheries and weeks that would have been affected in 1975 had option 3A been implemented in that year. It should be noted that some salmon released during the restricted periods (shaded areas) would have been taken later in the fishery, either in the same or other areas.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M -12
B -7
C -45
L -0
D -44
K -0
E -56
J -42
F -55
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H -17
G-0

Figure 15.

Fisheries and weeks that would have been affected in 1975 had option 3B been implemented in that year. It should be noted that some salmon released during the restricted periods (shaded areas) would have been taken later in the fishery, either in the same or other areas.

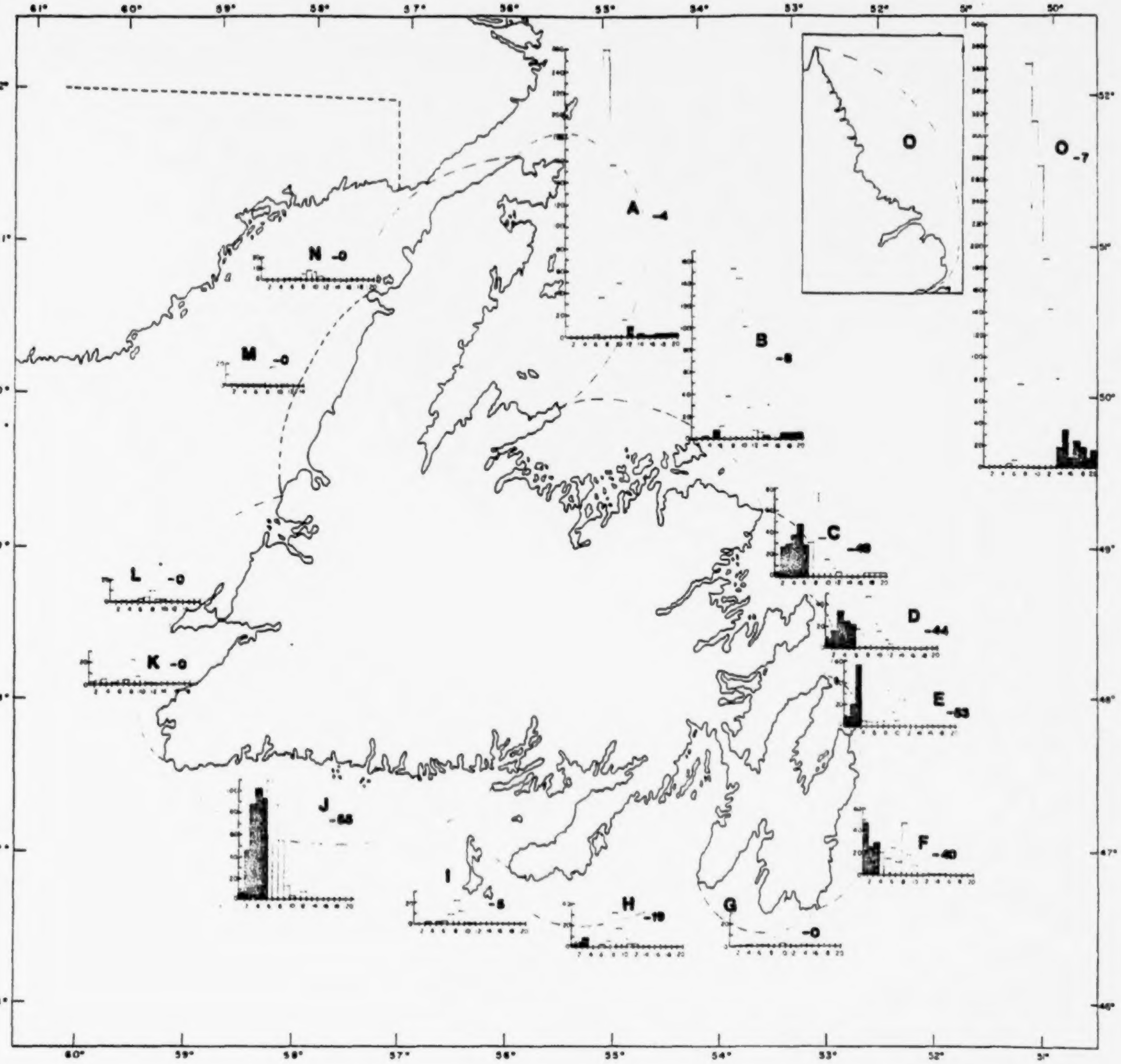
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Figure 16.

Fisheries and weeks that would have been affected in 1975 had option Q been implemented in that year. It should be noted that some salmon released during the restricted periods (shaded areas) would have been taken later in the fishery, either in the same or other areas.

Table 1. Possible regulatory approaches toward solving the problem of the harvesting of mainland origin salmon in the Newfoundland fishery. (The Working Group decided to develop approach number 3 and accordingly, developed a set of regulatory options, Table 2).

1. Stop Newfoundland fishery.
2. Do nothing.
3. A. Seasonal adjustment of fishing period:
    - a) delay opening;
    - b) early closure;
    - c) shorter fishing week;
    - d) moving time closure;
    - e) fixed time closure;

   B. Flexible adjustment* of fishing period:
    - a) delay opening;
    - b) early closure;
    - c) shorter fishing week;
    - d) moving time closure;
    - e) fixed time closure;
4. Effort (by Area):
    - a) number of fishermen;
    - b) fathomage limitation per berth;
    - c) limitation of number of berths;
    - d) mesh size limitations;
    - e) fishing methods (off-shore nets?);
    - f) fishing berth location (estuarial fishery?);
    - g) number of boats licenced;
5. Quota
    - a) total;
    - b) by area;
    - c) by licence;
6. Key Area restrictions.

*This adjustment would involve changing the fishing patterns to compensate for expected variations in such factors as ice conditions, timing of runs, and migration patterns.

Table 2. Week and week numbers referred to in text, tables, and figures.

Week	Date
1	May 12 - 18
2	May 19 - 25
3	May 26 - June 1
4	June 2 - 8
5	June 9 - 15
6	June 16 - 22
7	June 23 - 29
8	June 30 - July 6
9	July 7 - 13
10	July 14 - 20
11	July 21 - 27
12	July 28 - Aug 3
13	Aug 4 - 10
14	Aug 11 - 17
15	Aug 18 - 24
16	Aug 25 - 31
17	Sept 1 - 7
18	Sept 8 - 14
19	Sept 15 - 21
20	Sept 22 - 28
21	Sept 29 - Oct 5
22	Oct 6 - 12
23	Oct 13 - 19
24	Oct 20 - 26
25	Oct 27 - Nov 2
26	Nov 3 - 9
27	Nov 10 - 16
28	Nov 17 - 23
29	Nov 24 - 30
30	Dec 1 - 7
31	Dec 8 - 14
32	Dec 15 - 21
33	Dec 22 - 28
34	Dec 29 - 31

Table 3. Regulatory options considered by the Working Group. Area letters refer to Fisheries Statistical Areas (see Figure 1).

Option 1:

A. Conduct fishery only in or near estuaries, subject to possible season adjustments to ensure mainland escapements.

B. Season adjustments including:
   (a) Closure on August 31 (week 16);
   (b) In-season closure in Areas A and B from June 16 to July 13 (weeks 6-9);
   (c) Delayed season opening in Areas C-F until after June 22 (week 6);
   (d) In-season closure in Areas H and J from June 9 to June 29 (weeks 5-7).

Option 2: With season closure after August 31 (week 16):

A. (a) Delayed opening in Areas A-J until after June 22 (week 6);
B. (a) Delayed opening in Areas A-F until after June 22 (week 6);
   (b) In-season closure in Areas H and J from June 11 to June 30 (weeks 5-7).

Option 3: With season closure after August 31 (week 16):

A. (a) Delayed opening in Areas A-J until after June 15(week 5);
B. (a) Delayed opening in Areas A-F until after June 15(week 5);
   (b) In-season closure in Areas H and J from June 9 to June 29(weeks 5-7);

Option 0: Season adjustments including:

A. (a) Closure in Area 0 after August 10 (week 13);
   (b) Closure in Area A after July 27 (week 11);
   (c) Delayed opening in Area B until after June 15 (week 5) and closure after August 10 (week 13);
   (d) Delayed opening in Area C until after June 22 (week 6);
   (e) Delayed opening in Area D until after June 15 (week 5);
   (f) Delayed opening in Areas E and F until after June 1 (week 3);
   (g) Delayed opening in Area H until after June 8 (week 4);
   (h) Delayed opening in Areas I and J until after June 15 (week 5).

Table 4.

OPTION 1A

POUNDS

GAINS

Salmon to Maritimes	500,000	
Salmon toward Quebec	533,000	
Subtotal		1,033,000
Salmon to Nfld. Sport Fishery	N/A	
Subtotal	N/A	
Salmon available for modified Nfld. commercial fishery*	N/A	
Total		N/A

LOSSES

(From Nfld. commercial fishery)	-	
Maritime origin salmon	422,000	
Quebec origin salmon	527,000	
Nfld. origin salmon	N/A	
Total		N/A

NUMBERS

GAINS

Salmon to Maritimes	54,000	
Salmon toward Quebec	46,000	
Subtotal	100,000	
Salmon to Nfld. Sport Fishery	N/A	
Subtotal	N/A	
Salmon available for modified Nfld. commercial fishery*	N/A	
Total		N/A

LOSSES

(From Nfld. commercial fishery)		
Maritime origin salmon	60,000	
Quebec origin salmon	55,000	
Nfld. origin salmon	N/A	
Total		N/A

*Rivers to which salmon will go are not identified, all salmon potentially available for river harvest are also considered losses until suitable management programs and harvesting strategies can be developed. Such programs and strategies will be practically impossible to implement in many relatively small but yet important river systems where overexploitation could most likely occur.

Table 5.

OPTION 1B

POUNDS

GAINS

Salmon to Maritimes	239,000		
Salmon toward Quebec	268,000		
Subtotal		507,000	
Salmon to Nfld. Sport Fishery	98,000		
Subtotal		605,000	
Salmon available for modified Nfld. commercial fishery*	483,000		
Total			1,088,000

LOSSES

(From Nfld. commercial fishery)

Maritime origin salmon	204,000	
Quebec origin salmon	262,000	
Nfld. origin salmon	580,000	
Total		1,046,000

NUMBERS

GAINS

Salmon to Maritimes	25,000		
Salmon toward Quebec	24,000		
Subtotal		49,000	
Salmon to Nfld. Sport Fishery	19,000		
Subtotal		68,000	
Salmon available for modified Nfld. commercial fishery*	93,000		
Total			161,000

LOSSES

(From Nfld. commercial fishery)

Maritime origin salmon	28,000	
Quebec origin salmon	27,000	
Nfld. origin salmon	112,000	
Total		167,000

*Rivers to which salmon will go are not identified, all salmon potentially available for river harvest are also considered losses until suitable management programs and harvesting strategies can be developed. Such programs and strategies will be practically impossible to implement in many relatively small but yet important river systems where overexploitation could most likely occur.

Table 6.

OPTION 2A

POUNDS

GAINS

Salmon to Maritimes	225,000		
Salmon toward Quebec	307,000		
Subtotal		532,000	
Salmon to Nfld. Sport Fishery	88,000		
Subtotal		620,000	
Salmon available for modified Nfld. commercial fishery*	429,000		
Total			1,049,000

LOSSES

(From Nfld. commercial fishery)

Maritime origin salmon	219,000	
Quebec origin salmon	307,000	
Nfld. origin salmon	517,000	
Total		1,043,000

NUMBERS

GAINS

Salmon to Maritimes	24,000		
Salmon toward Quebec	29,000		
Subtotal		53,000	
Salmon to Nfld. Sport Fishery	17,000		
Subtotal		70,000	
Salmon available for modified Nfld. commercial fishery*	83,000		
Total			153,000

LOSSES

(From Nfld. commercial fishery)

Maritime origin salmon	25,000	
Quebec origin salmon	31,000	
Nfld. origin salmon	100,000	
Total		156,000

*Rivers to which salmon will go are not identified, all salmon potentially available for river harvest are also considered losses until suitable management programs and harvesting strategies can be developed. Such programs and strategies will be practically impossible to implement in many relatively small but yet important river systems where overexploitation could most likely occur.

Table 7.

OPTION 2B

POUNDS

GAINS

Salmon to Maritimes	190,000	
Salmon toward Quebec	220,000	
Subtotal	410,000	
Salmon to Nfld. Sport Fishery	87,000	
Subtotal	497,000	
Salmon available for modified Nfld. commercial fishery*	421,000	
Total		918,000

LOSSES

(From Nfld. commercial fishery)

Maritime origin salmon	183,000	
Quebec origin salmon	219,000	
Nfld. origin salmon	508,000	
Total		910,000

NUMBERS

GAINS

Salmon to Maritimes	21,000		
Salmon toward Quebec	21,000		
Subtotal		42,000	
Salmon to Nfld. Sport Fishery	17,000		
Subtotal		59,000	
Salmon available for modified Nfld. commercial fishery*	81,000		
Total			140,000

LOSSES

(From Nfld. commercial fishery)

Maritime origin salmon	22,000	
Quebec origin salmon	22,000	
Nfld. origin salmon	98,000	
Total		142,000

*Rivers to which salmon will go are not identified, all salmon potentially available for river harvest are also considered losses until suitable management programs and harvesting strategies can be developed. Such programs and strategies will be practically impossible to implement in many relatively small but yet important river systems where overexploitation could most likely occur.

Table 8.

OPTION 3A

POUNDS

GAINS

Salmon to Maritimes	164,000	
Salmon toward Quebec	257,000	
Subtotal		421,000
Salmon to Nfld. Sport Fishery	54,000	
Subtotal		475,000
Salmon available for modified Nfld. commercial fishery*	269,000	
Total		745,000

LOSSES

(From Nfld. commercial fishery)

Maritime origin salmon	165,000	
Quebec origin salmon	257,000	
Nfld. origin salmon	323,000	
Total		745,000

NUMBERS

GAINS

Salmon to Maritimes	18,000	
Salmon toward Quebec	24,000	
Subtotal		42,000
Salmon to Nfld. Sport Fishery	10,000	
Subtotal		52,000
Salmon available for modified Nfld. commercial fishery*	52,000	
Total		104,000

LOSSES

(From Nfld. commercial fishery)

Maritime origin salmon	18,000	
Quebec origin salmon	25,000	
Nfld. origin salmon	63,000	
Total		106,000

*Rivers to which salmon will go are not identified, all salmon potentially available for river harvest are also considered losses until suitable management programs and harvesting strategies can be developed. Such programs and strategies will be practically impossible to implement in many relatively small but yet important river systems where overexploitation could most likely occur.

Table 9.

OPTION 3B

POUNDS			
GAINS			
Salmon to Maritimes	143,000		
Salmon toward Quebec	190,000		
Subtotal		333,000	
Salmon to Nfld. Sport Fishery	67,000		
Subtotal		400,000	
Salmon available for modified Nfld. commercial fishery*			726,000
Total			
LOSSES			
(From Nfld. commercial fishery)			
Maritime origin salmon	142,000		
Quebec origin salmon	189,000		
Nfld. origin salmon	394,000		
Total			725,000
NUMBERS			
GAINS			
Salmon to Maritimes	16,000		
Salmon toward Quebec	18,000		
Subtotal		34,000	
Salmon to Nfld. Sport Fishery	17,000		
Subtotal		51,000	
Salmon available for modified Nfld. commercial fishery*	63,000		
Total			114,000
LOSSES			
(From Nfld. commercial fishery)			
Maritime origin salmon	16,000		
Quebec origin salmon	19,000		
Nfld. origin salmon	81,000		
Total			116,000

*Rivers to which salmon will go are not identified, all salmon potentially available for river harvest are also considered losses until suitable management programs and harvesting strategies can be developed. Such programs and strategies will be practically impossible to implement in many relatively small but yet important river systems where overexploitation could most likely occur.

Table 10.

OPTION Q

POUNDS

GAINS

Salmon to Maritimes	164,000		
Salmon toward Quebec	271,000		
Subtotal		435,000	
Salmon to Nfld. Sport Fishery	45,000		
Subtotal		481,000	
Salmon available for modified Nfld. commercial fishery*	272,000		
Total			753,000

LOSSES

(From Nfld. commercial fishery)

Maritime origin salmon	161,000	
Quebec origin salmon	268,000	
Nfld. origin salmon	318,000	
Total		747,000

NUMBERS

GAINS

Salmon to Maritimes	17,000		
Salmon toward Quebec	25,000		
Subtotal		42,000	
Salmon to Nfld. Sport Fishery	9,000		
Subtotal		51,000	
Salmon available for modified Nfld. commercial fishery*	53,000		
Total			104,000

LOSSES

(From Nfld. commercial fishery)

Maritime origin salmon	18,000	
Quebec origin salmon	27,000	
Nfld. origin salmon	61,000	
Total		106,000

*Rivers to which salmon will go are not identified, all salmon potentially available for river harvest are also considered losses until suitable management programs and harvesting strategies can be developed. Such programs and strategies will be practically impossible to implement in many relatively small but yet important river systems where overexploitation could most likely occur.

Table 11. Salmon increases in Maritimes and Quebec in relation to losses from Newfoundland's commercial fishery assuming management methods and harvesting strategies were developed to harvest Newfoundland origin salmon which are surplus to spawning requirement and escaping the Newfoundland commercial fishery as a result of option implementation.*

Option	Gain to Mainland (pounds)	Escapement from Nfld. Comm. Fishery (pounds)	Available for Recreational & Modified Nfld. Commercial Fishery (pounds)	Escapement Ratio Pounds to Mainland : Pounds from Nfld. Fishery	Total Gain Ratio* Total Potential Gain to all Fisheries (pounds) : Total Loss to Nfld. Comm. Fishery
1A	1,000,000	No Estimate	No Estimate	No Estimate	No Estimate
2A	532,000	1,043,000	517,000	1 : 2.0	1.01 : 1**
1B	507,000	1,046,000	580,000	1 : 2.1	1.01 : 1
Q	435,000	747,000	318,000	1 : 1.7	1.01 : 1
3A	421,000	745,000	323,000	1 : 1.8	1 : 1
2B	410,000	910,000	509,000	1 : 2.2	1.01 : 1
3B	333,000	725,000	394,000	1 : 2.2	1 : 1

Option	Gain to Mainland (Number)	Escapement from Nfld. Comm. Fishery (Number)	Available for Recreational & Modified Nfld. Commercial Fishery (Pounds)	Escapement Ratio Number to Mainland : Number from Nfld. Fishery	Total Gain Ratio* Total Potential Gain to all Fisheries (Number) : Total Loss to Nfld. Comm. Fishery
1A	100,000	No Estimate	No Estimate	No Estimate	No Estimate
2A	53,000	156,000	100,000	1 : 2.9	0.98 : 1*
1B	49,000	167,000	112,000	1 : 3.4	0.96 : 1
Q	42,000	106,000	61,000	1 : 2.5	0.98 : 1
3A	42,000	106,000	63,000	1 : 2.5	0.98 : 1
2B	42,000	142,000	98,000	1 : 3.4	0.99 : 1
3B	34,000	116,000	81,000	1 : 3.4	0.98 : 1

**Total Gain Ratios were derived from total gains and total losses given in Tables 5 to 10. For example, from Table 6, the Total Gain Ratio for weights of salmon is 1,049,000 ÷ 1,043,000 = 1.01 and that for numbers of salmon is 153,000 ÷ 156,000 = 0.98.

*Rivers to which salmon will go are not identified, all potentially available for river harvest are also considered losses until suitable management programs and harvesting strategies can be developed. Such programs and strategies will be practically impossible to implement in many relatively small but yet important river systems where over-exploitation could most likely occur.

Table 12

Ranking of the seven options according to six different scenarios involving weight of salmon reallocated.

	Rank						
Ranking according to:	1	2	3	4	5	6	7
Max. Gains to Maritimes and Quebec	1A	2A	1B	Q	3A	2B	3B
Max. Gains to Maritimes	1A	1B	2A	2B	Q	3A	3B
Max. Gains to Quebec	1A	2A	Q	1B	3A	2B	3B
Minimum loss to Nfld. fishery	3B	3A	Q	2B	2A	1B	1A
Minimum gain : loss ratio	Q	3A	2A	1B	3B	2B	1A
Total gain ratio	1B	3B	2B	Q	2A	3A	-

Ranking of the seven options according to five different scenarios involving numbers of salmon reallocated.

	Rank						
Ranking according to:	1	2	3	4	5	6	7
Max. Gains to Maritimes and Quebec	1A	2A	1B	Q	3A	2B	3B
Max. Gains to Maritimes	1A	1B	2A	2B	3A	Q	3B
Max. Gains to Quebec	1A	2A	Q	3A	1B	2B	3B
Minimum loss to Nfld. fishery	3A	Q	3B	2B	2A	1B	1A
Minimum gain : loss ratio	Q	3A	2A	3B	1B	2B	1A
Total gain ratio	3B	3A	2B	2A	Q	1B	-

APPENDIX I. The determination of weekly catch curves and re-adjustment for the impact of ice conditions.

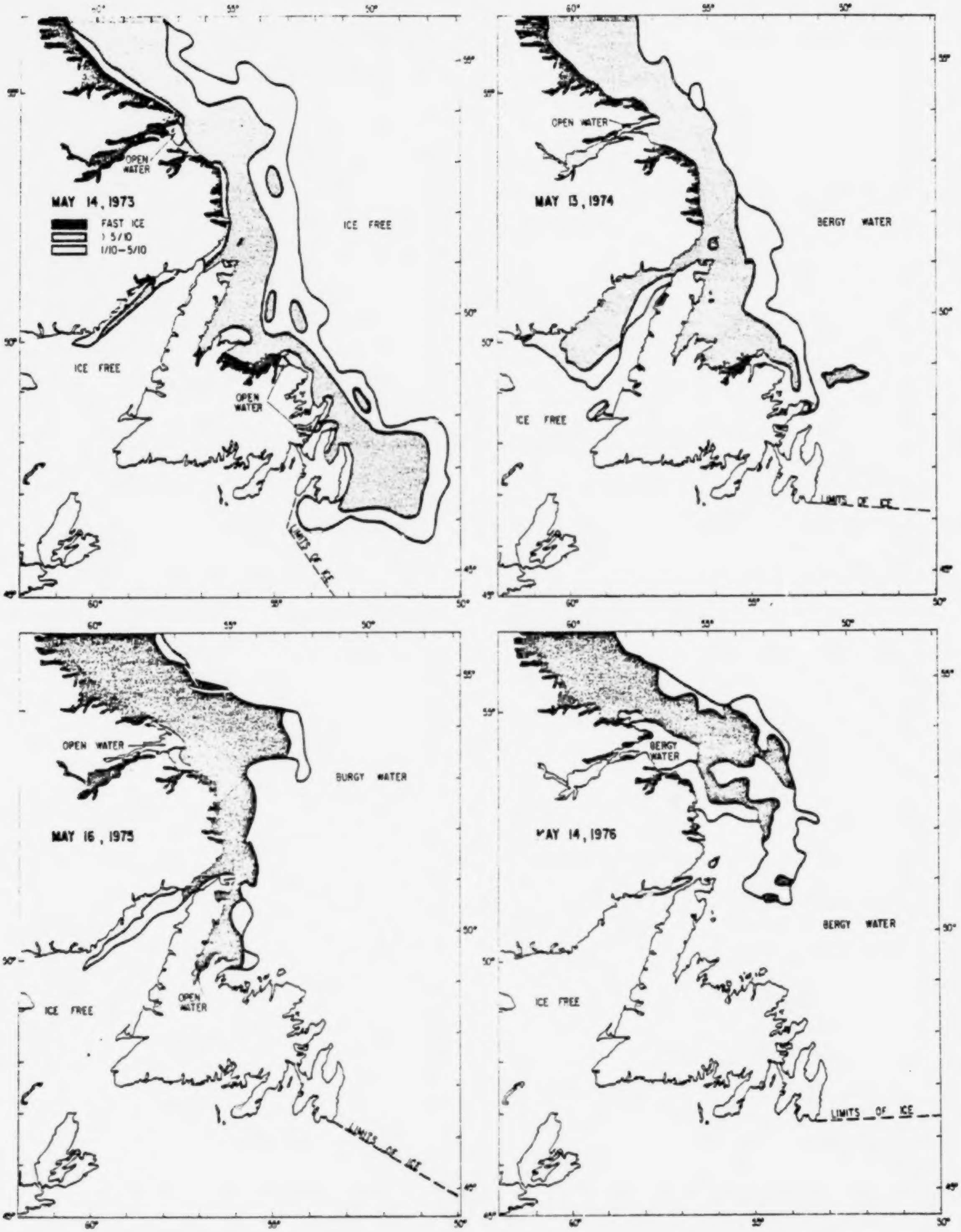
Catch curves were developed on a weekly basis from known monthly landings of small (1 sea-winter) and large (multi-sea-winter) salmon catches from 1969 to 1975 by prorating these monthly catches to catch by week on the basis of weekly landings in 1974 and 1975 to obtain an average catch by week in each area.

The fishery in the northern areas begins when the coastal ice leaves. Since catches in some years during 1969 to 1973 were taken previous to the first catches reported in 1974 and 1975, some adjustment was needed for annual ice conditions. These adjustments were necessary mainly on the east coast of Newfoundland in areas A, B, C, and D. Fig. 1 shows the distribution of ice in May of 1973, 74, 75, and 76. It can clearly be seen that ice in May of 1973 was distributed further south than it was in 1975. Consequently, the fishery along the east coast of Newfoundland would have begun earlier in 1975 than in 1973.

The tag return data from mainland stocks were then utilized to calculate the portion of Quebec and Maritimes stocks. The Mainland catches (weekly) of Mainland fish were subtracted from total weekly catches to calculate the Newfoundland-Labrador component. It was observed that some problems existed on the tails of the curves, i.e. week 15, Area A, where Newfoundland has a smaller commercial catch than the estimated catch of Quebec fish in the same Area. This also occurred for the Area J catch. Consequently, for Area A the catch was adjusted to account for these fish. In Area J average total catches for Section 36 plus 37 and 38 plus 39 were obtained by averaging over the period 1969-75. The weekly catches were estimated on the basis of 1974-75 average weekly catches and the weekly proportions were applied to the average monthly catches (1969-75). The Quebec and Maritimes components in Section 38 plus 39 were obtained by multiplying the weekly catches for weeks 1-5 by 0.70. (May 1973, Belding and Prefontaine 1947). The Quebec and Maritimes shares were proportioned on the basis of the original 52,936 lbs (Maritimes) and 63,749 lb (Quebec) in the fishery. The proportions for weeks 6 to 13 were based on the rates of catch in Sections 36 plus 37 to 38 plus 39. The proportions of Quebec and Maritimes fish were adjusted accordingly.

Assumptions:

1. The general shapes of the catch by week in each area during 1969-75 are relatively the same as those during 1974-75, with some adjustment in some areas for ice conditions.
2. The distributions of the catches within months for each area based on the 1974-75 catches by week are relatively the same as those for 1969-75 with some adjustment in some areas for ice conditions.
3. From catch by month and catch by week (1974-75 only) the data were prorated to monthly landings (1969-75) to obtain average catch by week in each area.
4. Since catches in some years during 1969-73 were taken previous to the first catches in 1974 and 1975, some adjustment in catch by week had to be made to allow for local ice conditions. This affected the shape and distribution of the catch curves in Areas A, B, C and D.
5. The weekly dates used are based on the average week during 1969-75 where week No. 1 is May 12 - May 18.


MAY 14, 1973
FAST ICE
> 5/10
1/10–5/10
OPEN WATER
ICE FREE
ICE FREE
OPEN WATER
LIMITS OF ICE
MAY 13, 1974
OPEN WATER
BERGY WATER
ICE FREE
LIMITS OF ICE
MAY 16, 1975
OPEN WATER
BURGY WATER
ICE FREE
OPEN WATER
LIMITS OF ICE
MAY 14, 1976
BERGY WATER
BERGY WATER
ICE FREE
LIMITS OF ICE
60°
55°
50°
45°

igure 1. Distribution of coastal ice around Newfoundland during mid-May, 1973-1976.

Source Documents for Appendix I

Belding, D.L. and G. Prefontaine. 1938. Studies on the Atlantic salmon - II. Report on the Salmon of the 1937 Port-aux-Basques (Newfoundland) Drift-Net Fishery. Contributions de l'Institut de Zoologie de L'Universite de Montreal - No. 3, 58p.

May, A.W. 1973. Distribution and Migrations of Salmon in the Northeast Atlantic. Int'l Atlantic Salmon Foundation, Spec. Publ. Ser. Vol. 4, No. 1, p. 373-382.

Reddin, D. and D.E. Waldron. 1976. 1975 Newfoundland and Labrador Atlantic Salmon Commercial Catch Data. Fish. & Mar. Serv. Tech. Rep. 684, 183p.

Reddin, D.G., and F.A. Day. 1980. 1969-72 Newfoundland and Labrador Atlantic Salmon (*Salmo salar*) Commercial Catch Data. Can. Data Rep. Fish. Aquat. Sci. 220:iv + 55p.

Waldron, D.E. 1974. 1973 Newfoundland and Labrador Atlantic Salmon Commercial Catch Data. Data Record Series No. NEW/D-74-1, 127p.

Waldron, D.E. 1974. 1974 Newfoundland Commercial Atlantic Salmon Fishery I. Preliminary Results for May and June. Data Record Series No. NEW/D-74-8, 67p.

APPENDIX II.

Table 1.

Summary of salmon landings (1969-1975, adjusted landings) showing estimated Maritimes, Quebec, and Newfoundland components in the Newfoundland-Labrador salmon fishery.

Area	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland-Labrador
A	510,076	81,417	83,805	165,222	344,854
B	314,582	46,616	38,637	85,253	229,329
C	224,999	62,170	52,481	114,651	110,348
D	200,500	38,587	25,200	63,787	136,713
E	169,097	20,399	60,665	81,064	88,033
F	193,571	23,677	39,365	63,042	130,529
G	30,729	1,726	0	1,726	29,003
H	135,167	20,404	14,259	34,663	100,504
I	68,028	4,249	17,620	21,869	46,159
J	493,491	89,443	137,618	227,061	266,430
K	78,994	866	0	866	78,128
L	24,139	0	706	706	23,433
M	29,982	0	0	0	29,982
N	20,889	0	0	0	20,889
Nfld.	2,494,244	389,554	470,356	859,910	1,634,334
Labrador (0)	1,310,422	27,997	46,403	74,400	1,236,022
Total	3,804,666	417,551	516,759	934,310	2,870,356
Per Cent		11.0%	13.6%	24.6%	75.4%

Table 2.

Average weekly landings (pounds) of salmon showing estimated Maritimes, Quebec and Newfoundland components in the Newfoundland fishery, based on adjusted 1969-75 landings.

AREA A

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1					
2					
3	1,416				1,416
4	21,425	2,294		2,294	19,131
5	32,000	5,424		5,424	26,576
6	55,102	17,222	7,728	24,950	30,152
7	81,372	10,763	7,728	18,491	62,881
8	92,524	10,827	14,690	25,517	67,007
9	88,345	13,505	21,376	34,881	53,464
10	73,094	10,120	8,414	18,534	54,560
11	37,923	7,651	12,277	19,928	17,995
12	21,854		7,728	7,728	14,126
13	2,926	1,016		1,016	1,910
14	1,269				1,269
15	84	1,060	3,864	4,924	(-4,840)
16	41	519		519	(- 478)
17	54				54
18	209				209
19	101	1,016		1,016	(- 915)
20	54				54
21	-				
22	-				
23	115				115
24	72				72
25	-				
26	-				
27	96				96
28					
29					
30					
31					
32					
33					
34					
Total	510,076	81,417	83,805	165,222	344,854
Percent		16.0	16.4	32.4	67.6

Table 3.

AREA B

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	200				200
2	800				800
3	2,009				2,009
4	13,303	7,108	3,836	10,944	2,359
5	42,737	7,723	11,506	19,229	23,508
6	43,687	4,642		4,642	39,045
7	36,390	6,444	1,371	7,815	28,575
8	26,453	6,972	1,371	8,343	18,110
9	50,206	8,247	686	8,933	41,273
10	42,304	2,145	7,672	9,817	32,487
11	23,133	2,282	7,672	9,954	13,179
12	9,982				9,982
13	12,355	691		691	11,664
14	4,436				4,436
15	758				758
16	56				56
17	98				98
18	196				196
19	393				393
20	294				294
21	74				74
22	74				74
23	1,294				1,294
24	296	181		181	115
25	86				86
26					
27	675	181	3,836	4,017	(-3,342)
28	1,773				1,773
29					
30	231				231
31	190				190
32	99		687		(-588)
33					
34					
TOTAL	314,582	46,616	38,637	85,253	229,329
Percent		14.8	12.3	27.1	72.9

Table 4.

AREA C

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	6,412	1,319		1,319	5,093
2	5,722	4,283		4,283	1,439
3	14,085	8,945	3,825	12,770	1,315
4	28,210	10,801	11,476	22,277	5,933
5	34,131	7,310	7,651	14,961	19,170
6	39,304	11,307	4,513	15,820	23,484
7	25,892	3,442	9,027	12,469	13,423
8	21,410	4,202	8,339	12,541	8,869
9	22,922	4,065	3,825	7,890	15,032
10	9,583	1,669	3,825	5,494	4,089
11	7,355	2,676		2,676	4,679
12	1,882	982		982	900
13	5,002	44		44	5,958
14	1,921				1,921
15	20	944		944	(-924)
16					
17	17				17
18	33				33
19	67				67
20	50				50
21	181				181
22	62				62
23	16				16
24	41				41
25	5				5
26	217				217
27	109	181		181	(-72)
28	109				109
29	108				108
30	133				133
31					
32					
33					
34					
Total	224,999	62,170	52,481	114,651	110,348
Percent		27.6	23.3	50.9	49.0

Table 5.

AREA D

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	3,015				3,015
2	7,113				7,113
3	17,596	10,593		10,593	7,003
4	32,136	5,343	3,973	9,316	22,820
5	26,534	4,858	16,573	21,431	5,103
6	26,654	3,437		3,437	23,217
7	23,867	3,298		3,298	20,569
8	19,660	2,727		2,727	16,933
9	18,149	3,499		3,499	14,650
10	13,370	2,433	681	3,114	10,256
11	5,208	497	3,973	4,470	738
12	2,155	181		181	1,974
13	2,834	1,211		1,211	1,623
14	1,443				1,443
15	634				634
16					
17					
18	11	510		510	(-499)
19					
20					
21					
22					
23	71				71
24					
25					
26					
27	44				44
28					
29					
30					
31	6				6
32					
33					
34					
Total	200,500	38,587	25,200	63,787	136,713
Percent		19.2	12.6	31.8	68.2

Table 6.

AREA E

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	7,893		3,837	3,837	4,056
2	16,620	1,515	13,922	15,437	1,183
3	26,088	1,952	11,509	13,461	12,627
4	28,813	3,804	11,509	15,313	13,500
5	12,329	3,985	~~706~~	4,691	7,638
6	31,490	2,637	11,509	14,146	17,344
7	16,961	1,073	7,673	8,746	8,215
8	10,874	1,818		1,818	9,056
9	9,193	1,775		1,775	7,418
10	3,751	497		497	3,254
11	4,626	218		218	4,408
12	67				67
13	91	944		944	(-853)
14					
15					
16					
17	152	181		181	(-29)
18					
19					
20					
21					
22					
23	77				77
24					
25					
26					
27	33				33
28					
29					
30					
31	39				39
32					
33					
34					
Total	169,097	20,399	60,665	81,064	88,033
Percent		12.1	35.8	47.9	52.1

Table 7.

AREA F

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	15,439				15,439
2	20,054	6,304	11,506	17,810	2,244
3	27,545	5,793	6,257	12,050	15,495
4	26,929	2,788		2,788	24,141
5	14,574	333	2,422	2,755	11,819
6	26,082	4,660	7,672	12,332	13,750
7	26,607	1,976	7,672	9,648	16,959
8	15,694	854		854	14,840
9	11,129	97	3,836	3,933	7,196
10	6,575				6,575
11	2,171				2,171
12	447	181		181	266
13	141	181		181	(-40)
14	15				15
15	141	510		510	(-369)
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27	28				28
28					
29					
30					
31					
32					
33					
34					
Total	193,571	23,677	39,365	63,042	130,529
Percent		12.2	20.4	32.6	67.4

Table 8.

AREA G

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1					
2					
3	261				261
4	1,281				1,281
5	2,424				2,424
6	3,789				3,789
7	5,224				5,224
8	4,397	981		981	3,416
9	7,920				7,920
10	3,546				3,546
11	1,110	745		745	365
12					
13	777				777
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
Total	30,729	1,726	0	1,726	29,003
Percent		5.6	0	5.6	94.4

Table 9.

AREA H

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	578				578
2	1,888	1,412		1,412	476
3	5,145	3,611	3,836	7,447	(-2,302)
4	6,988	2,474		2,474	4,514
5	7,453	2,048	7,671	9,719	(-2,266)
6	11,098	3,179		3,179	7,919
7	37,588	1,871	688	2,559	35,029
8	21,809	3,657	1,376	5,033	16,776
9	22,986	1,558	688	2,246	20,740
10	11,788	594		594	11,194
11	4,761				4,761
12	599				599
13	1,415				1,415
14	707				707
15					
16					
17	107				107
18					
19					
20					
21					
22					
23					
24	257				257
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
Total	135,167	20,404	14,259	34,663	100,504
Percent		15.1	10.5	25.6	74.4

Table 10.

AREA I

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	221				221
2	664				664
3	1,327				1,327
4	2,107		6,215	6,215	(-4,108)
5	3,643	430	3,802	4,232	(-589)
6	7,018	479	3,802	4,281	2,737
7	25,629	479		479	25,150
8	15,014	1,806	3,801	5,607	9,407
9	6,926	479		479	6,447
10	688	576		576	112
11	2,317				2,317
12	1,661				1,661
13	813				813
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
Total	68,028	4,249	17,620	21,869	46,159
Percent		6.3	25.9	32.1	67.9

Table 11.

AREA J EAST

(Districts 36 &37)

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	3,184				3,184
2	4,490				4,490
3	8,210	1,560	2,574	4,134	4,076
4	23,582	1,599	3,411	5,010	18,572
5	28,374	2,905	9,396	12,301	16,073
6	29,296	2,651	2,479	5,130	24,166
7	17,737	2,378	2,992	5,370	12,367
8	15,176	1,802	1,547	3,349	11,827
9	7,587	608	205	813	6,774
10	7,451	277		277	7,174
11	478				478
12	1,185	384	1,137	1,521	(-336)
13	131				131
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
Total	146,881	14,164	23,741	37,905	108,976
Percent		9.6	16.2	25.8	74.2

Table 12.

AREA J WEST

(Districts 38&39)

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	18,234	4,769	7,995	12,764	5,470
2	25,712	6,725	11,273	17,998	7,714
3	47,012	12,296	20,612	32,908	14,104
4	56,181	14,695	24,632	39,327	16,854
5	67,599	17,681	29,638	47,319	20,280
6	69,791	6,257	5,850	12,107	57,684
7	42,259	5,612	7,062	12,674	29,585
8	9,425	4,251	3,649	7,900	1,525
9	4,713	1,435	483	1,918	2,795
10	4,628	652		652	3,976
11	297				297
12	736	906	2,683	3,589	(-2,853)
13	23				23
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
Total	346,610	75,279	113,877	189,156	157,454
Percent		21.7	32.9	54.6	45.4

Table 13.

AREA J TOTAL

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	21,418	4,769	7,995	12,764	8,654
2	30,202	6,725	11,273	17,998	12,204
3	55,222	13,856	23.186	37,042	18.180
4	79,763	16,294	28,043	44,337	35.426
5	95,973	20,586	39,034	59,620	36,353
6	99,087	8,908	8,329	17,237	81,850
7	59,996	7.990	10,054	18,044	41,952
8	24,601	6,053	5,196	11,249	13,352
9	12,300	2,043	688	2,731	9,569
10	12,079	929		929	11,150
11	775				775
12	1,921	1,290	3,820	5,110	(-3.189)
13	154				154
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
Total	493.491	89,443	137,618	227,061	266,430
Percent		18.1	27.9	46.0	54.0

Table 14.

AREA K

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1	413				413
2	1,763				1,763
3	5,574				5,574
4	5,166				5,166
5	8,594	441		441	8,153
6	18,050				18,050
7	19,656	218		218	19,438
8	14,246				14,246
9	3,881	207		207	3,674
10					
11	795				795
12					
13	856				856
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
Total	78,994	866	0	866	78,128
Percent		1.1	0.0	1.1	98.9

Table 15.

AREA L

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1					
2					
3	640				640
4	106				106
5	385				385
6	3,110				3,110
7	10,861				10,861
8	6,701				6,701
9	1,549				1,549
10	559		706	706	(- 147)
11	67				67
12					
13	161				161
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
Total	24,139	0	706	706	23,433
Percent		0.0	2.9	2.9	97.1

Table 16.

AREA M

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1					
2	110				110
3	239				239
4	122				122
5	3,786				3,786
6	4,898				4,898
7	4,585				4,585
8	7,290				7,290
9	6,376				6,376
10					
11	584				584
12					
13	1,992				1,992
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
Total	29,982	0	0	0	29,982
Percent		0.0	0.0	0.0	100.0

Table 17.

AREA N

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1					
2					
3					
4					
5	159				159
6	597				597
7	2,525				2,525
8	1,560				1,560
9	6,808				6,808
10	6,683				6,683
11	1,784				1,784
12	627				627
13					
14	139				139
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27	7				7
28					
29					
30					
31					
32					
33					
34					
Total	20,889	0	0	0	20,889
Percent		0.0	0.0	0.0	100.0

Table 18.

AREA O

Week	Average 1969-75	Maritimes	Quebec	Quebec & Maritimes	Newfoundland Labrador
1					
2					
3					
4	10,290				10,290
5	14,636				14,636
6	21,055	1,287		1,287	19,768
7	97,865	1,389	3,811	5,200	92,665
8	203,709	2,676	3,811	6,487	197,222
9	318,736	1,389	689	2,078	316,658
10	241,699	7,306	10,036	17,342	224,357
11	162,543	5,110	11,433	16,543	146,000
12	94,091	5,492	689	6,181	87,910
13	68,073	2,223		2,223	65,850
14	22,224	472		472	21,752
15	27,300	472	3,811	4,283	23,017
16	12,075			–	12,075
17	6,628		3,811	3,811	2,817
18	4,614				4,614
19	1,750		3,811	3,811	(-2,061)
20	2,121		690	690	1,431
21	1,013		3,811	3,811	(-2,798)
22					
23		181		181	(- 181)
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
TOTAL	1,310,422	27,997	46,403	74,400	1,236,022
Percent		2.1	3.5	5.6	94.4

Note on Appendix IX

Recalculation of Mainland Component in Area J.

Methods and Assumptions:

1. Average total catches for Districts (36 and 37) and (38 and 39) were obtained by averaging over the period 1969-75. The weekly catches were estimated on the basis of 1974-75 average weekly catches and the weekly proportions (by month) were applied to the average monthly catches (1969-75).

2. The Quebec and Maritime components in Districts (38 and 39) were obtained by multiplying the weekly catches for weeks 1-5 by 0.70. The Quebec and Maritime shares were proportioned on the basis of the original 52,936 lb (Maritimes) and 63,749 lb (Quebec) in the fishery. The proportions for weeks 6-13 were based on the original table, but scaled down accordingly on the basis of catch (36-37)/ catch (38 and 39).

   The proportions of Quebec and Maritime in Districts (36 and 37) were based on the original assessments scaled down accordingly.

   The four areas 36, 37, 38 and 39 catches by week were then totalled to give a total catch by week for Area J and the corresponding, Maritime, Quebec and Newfoundland components.

APPENDIX III.

Compilation of Tagging Data from Maritimes Origin Salmon

Information related to stocks tagged, numbers tagged, and numbers recaptured per major harvest area is summarized in Table 1. Figures shown represent total returns. Not all returns could be used in all calculations related to exploitation rates, harvest areas, harvest time, etc. because recaptures often were not fully documented by those returning them to us; however, enough information was forwarded for use in certain calculations.

All tag returns from Greenland and Newfoundland were from commercial fisheries; whereas, in home waters, tag returns came from commercial nets, anglers, Indian fishermen, and experimental nets or traps. For purposes of Table 1, no attempt has been made to re-group tags according to estimates of whether or not they could have returned to "home" that year.

TABLE 1. Compilation of tagging data base.

W - wild or native smolts
H - hatchery smolts

RELEASE LOCATION FOR TAGGED SMOLTS	YEARS TAGGING CARRIED OUT	STOCK TAGGED	TOTAL NO. TAGGED	NUMBERS RECAPTURED PER MAJOR HARVEST AREA									TOTAL RECAPTURES[2]
				GREENLAND			NEWFOUNDLAND			"HOME" RIVER AREAS			
				1-S-W	2-S-W	3-S-W	1-S-W	2-S-W	3-S-W	1-S-W	2-S-W	3-S-W	
Miramichi R.[1]	1968-74	Miramichi (W)	53,207	233	9	3	199	168	7	231	297	8	1,087
Miramichi R., N.B.	1968-71	Restigouche/Bay of Chaleur (H)	52,492	138	17	3	94	70	3	108	78	16	527
Restigouche River, N.B.	1968-72	Restigouche/Bay of Chaleur (H)	46,212	96	16	1	48	31	1	14	11	3	221
St. John River, N.B.	1970-73	St. John River (H)	236,672	134	4	0	44	0	0	584	314	3	1,083
River Philip, N.S.	1968-72	River Philip (H)	64,910	80	11	1	32	23	3	33	24	2	209
West River, N.S.	1968-69	West River (W)	4,828	4	0	0	3	1	0	52	6	0	66
Medway River, N.S.	1971-72	Medway River (H)	14,793	16	0	0	4	0	0	6	8	1	35
LaHave River, N.S.	1971-73	Medway River (H)	31,233	49	2	0	23	1	0	242	35	5	357

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[1] Includes tagging at Millbank (Miramichi estuary) and on the Southwest Miramichi (Quarryville).
[2] No correction was made for non-reporting of tags.

APPENDIX IV

Independent estimate of the proportion of Newfoundland-Labrador origin salmon in the Newfoundland-Labrador commercial fishery.

1. Based on angling catches, (from Appendix VIII):

    Mean yield from Newfoundland stocks, 1973-75 = 3,520,715 lb
    Mean catch in commercial fishery, 1973-75 = 4,463,000 lb
    Proportion Newfoundland-Labrador origin salmon = 3,520,715 ÷ 4,463,000
    = .789

2. Based on freshwater production estimates & angling catches:

    (a) Estimated yield from insular Newfoundland rivers (average of columns 7 & 8, page 93, Appendix VII) = 1,532,985 lb
    (b) Mean yield from Labrador rivers (from Appendix VIII) = 1,950,152 lb
    (c) Median yield from Newfoundland-Labrador rivers = 3,483,137

3. Mean yield from #1 = 3,520,715 lb
    Median yield from #2 = $\underline{3,483,137}$ lb
    Mean = 3,501,926 lb

4. Approximate proportion Newfoundland-Labrador origin salmon:

$$\frac{(\text{from \#3})}{(\text{from \#1})} \quad \frac{3,500,000}{4,463,000} = 0.784$$

APPENDIX V.

Method of estimating weights of Quebec origin salmon in the Nfld-Labrador fisheries

Weight estimates of Quebec origin salmon caught in the Newfoundland-Labrador fisheries were obtained using tag recaptures as a basis for the calculations. Estimates of the numbers of salmon were first derived and then converted to weights.

The numbers of Quebec origin salmon caught in the Newfoundland fisheries were estimated by equating the ratio of percent tag returns from home fisheries on the mean annual number of salmon caught in the Quebec angling fishery to the ratio of Quebec tag returns from Nfld-Labrador on the mean annual number of Quebec origin salmon caught in the Nfld-Labrador fisheries. The equation was solved for the latter component which is the unknown. Tagging data used in these estimates include returns from smolts released in 1971 and 1972 (table 1) and subsequently recaptured between 1972-1975. The mean annual number of salmon taken by angling in home owners was calculated over the 1972-1975 (table 2) period so that it only includes data taken during the commercial salmon ban period in Gaspé and New-Brunswick. Sea-age composition as determined through scale readings for angling catches (table 3) or inferred from year of return in the case of tag returns has allowed calculations of seperated estimates for 1 SW, 2 SW and 3 SW salmon (table 4).

The numbers of salmon in each sea-age categories were then converted to weight estimates using the following average weights: 2,04 kg for 1 SW, 4,48 kg for 2 SW and 7,69 kg for 3 SW salmon (Table 5). It is noteworthy to mention that the lack of smolt tagging information has precluded any estimation of the contribution of two Quebec salmon stocks to the Nfld-Labrador, Anticosti and Lower North Shore, although it is known through adult tagging that they contribute to these fisheries. Also those estimates were not adjusted for tag loss (falling rate) and for non report of salmon catches in the angling fisheries. For all of these reasons it would appear that these estimates would describe a minimal contribution to the Nfld fisheries.

However, an adjustment has been made for non report of tags in area J of the Nfld fisheries because it was evident that fishermen in this area were not reporting all of the tags. As a result of this adjustment the estimated contribution of Quebec salmon to the Newfoundland-Labrador fisheries has been raised to 234 890 kg (or 516 759 pounds).

Table 1. Tag returns from smolts released in 1971 and 1972 according to area and year of recapture

Area	Year of return after release			
	1	2	3*	4**
Greenland	113 (49.13)	15 (6.52)	2 (0.86)	0 (0.00)
Nfld-Labrador	14 (6.08)	51 (22.17)	6 (2.60)	0 (0.00)
Home coastal waters	0 (0.00)	5 (2.17)	1 (0.43)	0 (0.00)
Angling	4 (1.73)	8 (3.47)	9 (3.91)	2 (0.86)

Note: Numbers in ( ) are percentage of total tag returns of all years and areas.

* : This group may include a few previously spawned fish as well as virgin salmon.

** : This group is composed of previously spawned fish exclusively.

Table 2. Reported angling catches from 1972-1975.

Year	Gaspé	Upper North Shore	Total
1972	5962	3271	9233
1973	6749	3657	10406
1974	7318	5123	12441
1975	5439	5163	10602
Total	25468	17214	42682
Annual mean	6366	4304	10670

Table 3. Sea age distribution of mean annual angling catch.

Area	Sea-age (number of fish)				
	1	2	3	P.S.	Total
Gaspé	860	3916	1405	185	6366
Upper North Shore	516	2569	1012	207	4304
Total	1376	6485	2417	392	10670

Table 4. Estimation of the mean annual number of Gaspé and Upper North Shore salmon intercepted in the Nfld-Labrador fisheries.

1 sea - winter salmon

$$\frac{1.73}{1376} = \frac{6.08}{x}$$

$$x = 4836$$

2 sea - winter salmon

$$\frac{3.47}{6485} = \frac{22.17}{x}$$

$$x = 41433$$

3 sea - winter salmon

$$\frac{3.91}{2417} = \frac{2.60}{x}$$

$$x = 1607$$

Table 5. Numbers and weights of Quebec origin salmon in the Nfld-Labrador fisheries.

Age group	Numbers	Weights (kg)
1 SW	4836	9865
2 SW	41433	185620
3 SW	1607	12358
Total	47876	207843

APPENDIX VI.

LIST OF ASSUMPTIONS MADE IN ESTIMATING DISTRIBUTION AND LEVELS OF CONTRIBUTION MADE TO NEWFOUNDLAND FISHERY BY MAINLAND SALMON RIVERS (EXCLUDING THE MIRAMICHI RIVER).

1. In all calculations the various river stocks were grouped as follows:

    (i) Restigouche River

    (ii) Minor Rivers in the Gulf - included all Nova Scotia and New Brunswick Rivers within the Gulf of St. Lawrence except the Restigouche and Miramichi Rivers.

    (iii) Nova Scotia Atlantic Coast Rivers - included all rivers on the Atlantic Coast of Nova Scotia.

    (iv) Bay of Fundy Rivers - included all Nova Scotia and New Brunswick Rivers draining into the Bay of Fundy.

2. Estimates were primarily based on tag return data for groups of hatchery-reared smolts. Tag groups of smolts released in rivers other than their native stream were excluded as their distribution patterns in the sea appeared to be atypical. The exceptions to this exclusion were groups of Chaleur Bay stocks released in the Miramichi River and Medway River smolts released in the adjacent LaHave River. For both exceptions the rivers into which the smolts were released were nearby the respective native rivers and tag distributions and return rates were similar to that of comparable release groups distributed in their native streams.

3. Tag return data included in the analyses originated from releases occurring from 1967 to 1973 inclusive.

4. A differential tag loss of 10% was assumed to exist between recaptures of 1-sea-winter salmon and 2- and 3-sea-winter salmon (Gray, 1973 and J. Ritter, personal communication).

5. A 30% non-reporting of tags was assumed for all fisheries. For releases for which spawning escapements were not determined directly from counts, the non-reporting correction factor was not used as escapements were estimated from the sport catch. For these groups it was assumed that the sport fishery took, depending on the intensity of the sport fishery in the river, 20% or 25% of the bright salmon entering the freshwater portions of the river.

6. The state of maturity of fish taken in the Newfoundland fishery was based on the time and location of recapture relative to the distance from and run-timing in the river to which they were destined to return. A travel rate of 20 miles per day was assumed in determining maturity status of tagged fish recaptured in the Newfoundland fishery.

   The other assumptions are outlined in the document entitled "A Model of the Restigouche River Salmon and the Benefits to Mainland derived from Proposed Regulation Changes for the Newfoundland Fishery".

APPENDIX VII.

ESTIMATES OF ADULT ATLANTIC SALMON PRODUCTION IN INSULAR NEWFOUNDLAND AND CONTRIBUTION TO THE COMMERCIAL FISHERIES

INTRODUCTION

This report provides an estimate of the adult production of Atlantic salmon in insular Newfoundland by Statistical Area. Calculations were made using the estimated natural freshwater production of smolts in all rivers that contain Atlantic salmon. Note that a range in smolt production has been given; however range in sea survival has not been taken into account due to lack of data on which to base assumptions.

ADULT SALMON PRODUCTION IN INSULAR NEWFOUNDLAND

The total drainage area of all rivers supporting Atlantic salmon populations in insular Newfoundland is 30,066.6 mi^2. Based on 33 river surveys (Fig. 1) there are 74.2 accessible parr rearing[1] units (100 yd^2) per mi^2 of drainage area (Addendum I). Total accessible rearing area in insular Newfoundland is 2,230,942 units.

Smolt production is estimated to be 1.3 to 4.0 per parr rearing unit (Addendum II). The total smolt production per mi^2 of drainage area is 96.5 to 296.8 and the total for insular Newfoundland is 2.9M to 8.9M smolt.

Sea survival (to the fisheries) is estimated to be 11.4% (Addendum III). The annual adult escapement (mainly grilse) to West River, St. Barbe, was directly related to the smolt production of the previous year, 1971-1975 (r=0.97) (Fig. 2). This suggests that the sea survival and commercial fishing efficiency for salmon from West River is relatively constant.

Estimated total adult production for insular Newfoundland is 330,103 to 1,015,279 salmon. The production of salmon by Statistical Area is given in Table 1. Areas B, J, L, A, C and K produce the greater number of fish (ranked in order of greatest production). However, Areas K, L, B, M and J produce the greater number of large salmon (ranked in order of greatest production).

NOTE: The percent large salmon produced in each Area was based on the ratio of large to small salmon as calculated by W.H. Lear for December 2, 1975, Working Party Committee (Table 2).

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[1] Parr rearing is that section of stream with bottom composition of gravel, rubble or boulder.

EXPECTED COMMERCIAL HARVEST OF NEWFOUNDLAND ORIGIN SALMON

Assuming that the Newfoundland commercial fishery exploits 85% of the large salmon and 55% of the small salmon, then the expected harvest of Newfoundland origin large salmon is 210,102 to 646,219 lb and of small salmon is 752,269 - 2,313,702 lb (Tables 3 and 4). Commercial harvest is also shown for each Statistical Area in Tables 3 and 4. Total harvest for all sizes of salmon is estimated to range from a low of approximately 1.0M lb to a high of 3.0M lb.

Pratt et al. (1974) reported that 26% of the harvested Labrador origin salmon is caught in the Newfoundland commercial fisheries. This is an annual catch of approximately 0.5M lb. Hence harvest of Newfoundland and Labrador origin salmon in Newfoundland commercial fisheries range from 1.5M lb to 3.5M lb.

Notes on Methods:

Estimate of adult Atlantic salmon production in insular Newfoundland and contribution to the commercial fisheries.

1. Calculation of adult productions was based on natural freshwater production of smolts in all rivers that contain Atlantic salmon.

2. Range in smolt production 1.3 to 4.0 smolt per 100 yd^2. Range in sea survival not given due to lack of data to base assumptions.

3. Total accessible parr rearing units (100 yd^2) in insular Newfoundland is 2,230,942.

4. Sea survival is 11.4% to the fishery.

5. The percent large salmon produced in each Area was based on the ratio of large to small salmon as calculated by H. Lear for the 2nd meeting (December 2, 1975).

6. Commercial fishery exploitation assumed to be 85% for large salmon and 55% for small salmon.

7. Newfoundland commercial fishery in Areas A to E harvest 0.5M lb of Labrador origin fish.

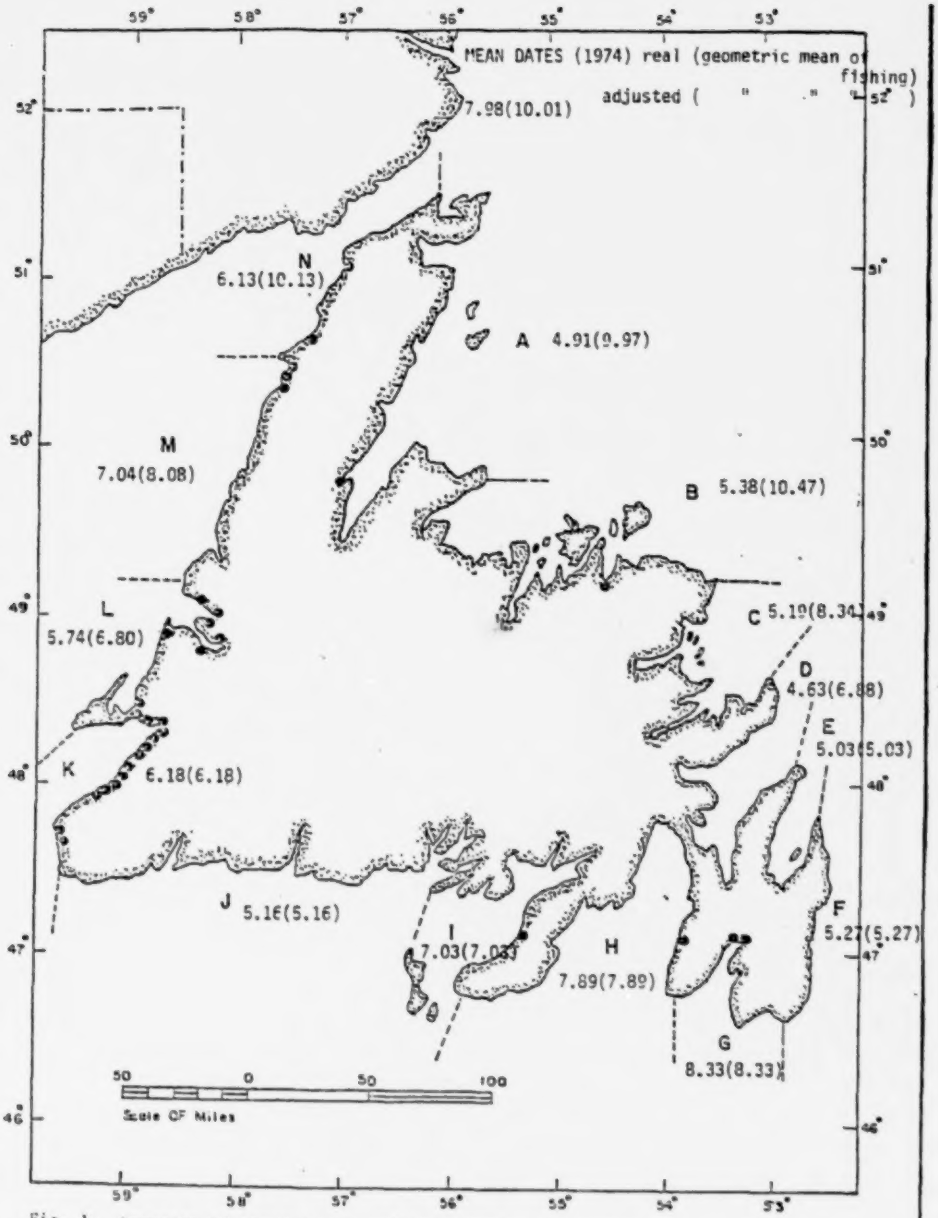
MEAN DATES (1974) real (geometric mean of fishing)
adjusted (" " ")
7.98(10.01)
N
6.13(10.13)
A 4.91(9.97)
M
7.04(8.08)
B 5.38(10.47)
L
5.74(6.80)
C 5.19(8.34)
D
4.63(6.88)
E
5.03(5.03)
K
6.18(6.18)
J 5.16(5.16)
I
7.03(7.03)
H
7.89(7.89)
F
5.27(5.27)
G
8.33(8.33)
50 0 50 100
Scale OF Miles
59° 58° 57° 56° 55° 54° 53°
52° 51° 50° 49° 48° 47° 46°

Fig. 1. Location of streams surveyed to determine the number of accessible parr rearing units. See Addendum I.

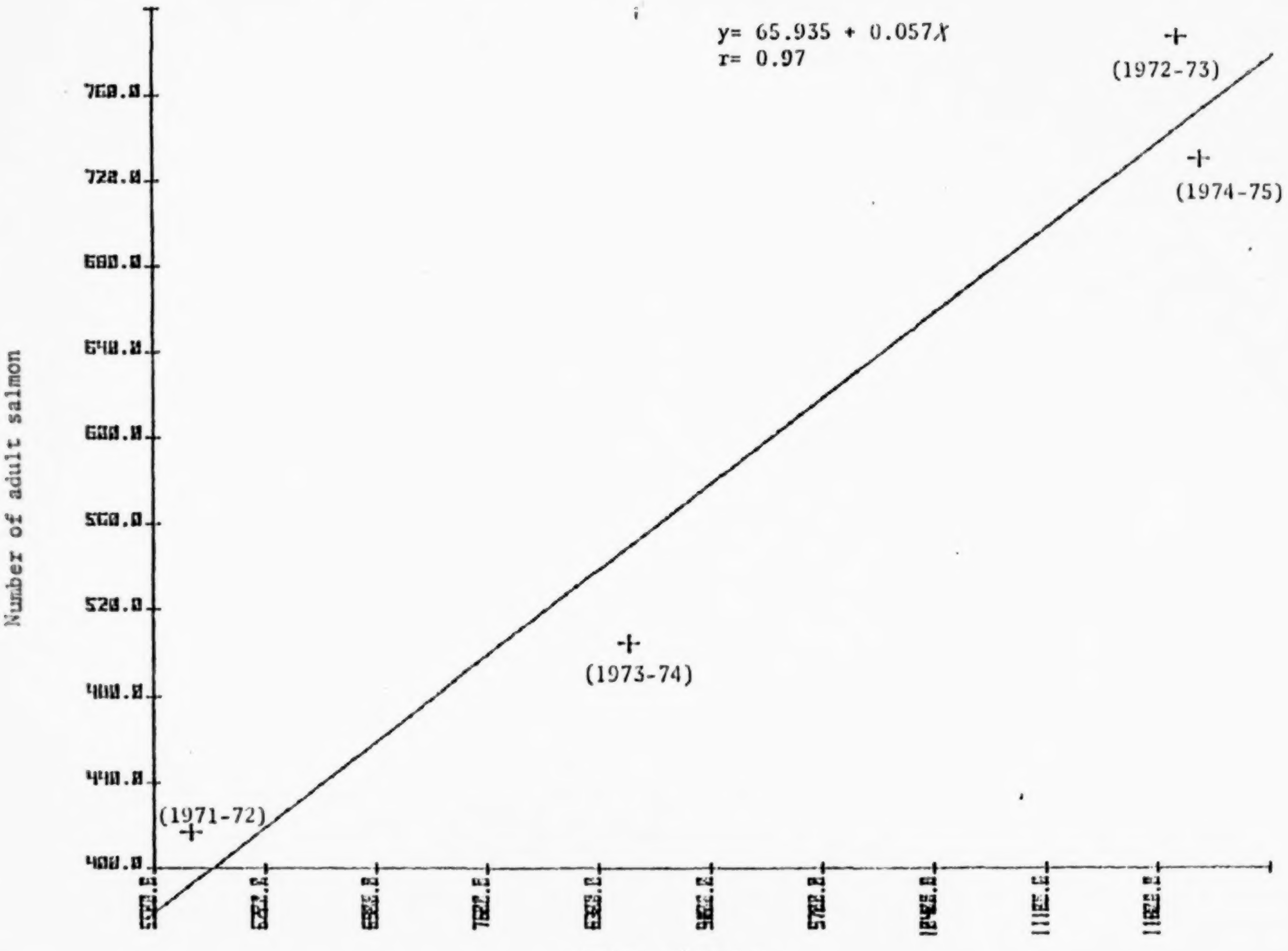

Fig. 2. Smolt production and subsequent adult salmon escapement to West River (St. Barbe), 1971 to 1975.

Table I. Estimated number of smolt and adult salmon produced, percent large salmon, number of large salmon and number of small salmon by Statistical Area. Based on 96.5 to 296.8 smolt per square mile and 11.4% sea survival.

Area	Drainage Area Mile 2	Smolt Production	Adult Production	Percent Large salmon	Number of large salmon	Number of small salmon
A	2,424.2	233,935 - 719,503	26,664 82,023	0.61	163 - 500	26,501 - 81,523
B	8,803.0	849,490 - 2,612,730	96,842 - 297,851	4.99	4,832 - 14,863	92,010 - 282,988
C	2,302.5	222,191 - 683,382	25,330 - 77,906	3.05	773 - 2,376	24,557 - 75,530
D	319.3	30,813 - 94,768	3,513 - 10,804	1.14	40 - 123	3,473 - 10,681
E	135.7	13,095 - 40,276	1,493 - 4,591	2.17	32 - 100	1,461 - 4,491
F	88.7	8,560 - 26,326	976 - 3,001	4.41	43 - 132	933 - 2,869
G	776.4	74,923 - 230,436	8,541 - 26,270	1.64	140 - 431	8,401 - 25,839
H	1,300.7	125,518 - 386,048	14,309 - 44,009	6.12	876 - 2,693	13,433 - 41,316
I	1,289.5	124,437 - 382,724	14,186 - 43,631	1.94	275 - 846	13,911 - 42,785
J	4,573.4	441,333 - 1,357,385	50,312 - 154,742	4.83	2,430 - 7,474	47,882 - 147,268
K	2,249.4	217,067 - 667,623	24,746 - 76,109	33.70	8,339 - 25,649	16,407 - 50,460
L	3,488.1	336,601 - 1,035,268	38,373 - 118,021	13.16	5,050 - 15,532	38,373 - 102,489
M	1,647.8	159,013 - 489,067	18,127 - 55,754	14.66	2,657 - 8,174	15,470 - 47,580
N	667.9	64,452 - 198,233	7,348 - 22,599	6.89	506 - 1,557	6,842 - 21,042
Total	30,006.6	2,895,637 - 8,905,959	330,103 -1,015,279	7.92	26,156 - 80,450	303,947 - 934,829

Table 2. Percent large salmon in stock of each Area, 1973, 1974, 1975. Based ratio of large to small salmon as calculated by H.W. Lear for Dec. 2, 1975 Working Party Committee.

Area	1973		1974		1975		Percent Large
	Small	Large	Small	Large	Small	Large	
A	30,950	154	27,720	385	28,825	0	0.61
B	79,750	1,808	83,953	3,486	99,050	8,515	4.99
C	21,110	400	20,463	808	24,850	885	3.05
D	1,630	0	3,788	38	1,175	38	1.14
E	1,310	0	1,663	77	500	0	2.17
F	940	123	638	0	1,088	0	4.41
G	26,975	615	23,188	431	31,118	308	1.64
H	17,850	1,615	15,150	538	7,118	462	6.12
I	19,725	492	18,163	346	12,188	154	1.94
J	67,533	2,462	76,688	2,692	79,500	6,208	4.83
K	64,300	39,115	54,000	28,615	72,138	29,077	33.70
L	38,380	11,446	35,838	6,615	77,900	5,000	13.16
M	32,925	6,000	20,313	4,715	25,700	2,846	14.66
N	33,100	5,692	27,953	723	33,950	615	6.89
Total	436,478	69,922	409,518	49,469	495,100	54,108	

Table 3. Estimated potential harvest of large salmon by Area at 85% fishing exploitation.

Area	Estimated Production of large salmon	Estimated Potential Harvest (No.)	Average Weight (lb.)	Estimated Potential Harvest (lb.)
A	163 - 500	139 - 425	9.0	1,251 - 3,825
B	4,832 - 14,863	4,107 - 12,634	9.0	36,963 - 113,706
C	733 - 2,376	623 - 2,020	9.0	5,607 - 18,180
D	40 - 123	34 - 105	9.0	306 - 945
E	32 - 100	27 - 85	9.0	243 - 765
F	42 - 132	36 - 112	9.0	324 - 1,008
G	140 - 431	119 - 366	9.0	1,071 - 3,294
H	876 - 2,693	745 - 2,289	9.0	6,705 - 20,601
I	275 - 846	234 - 719	9.0	2,106 - 6,471
J	2,430 - 7,474	2,066 - 6,353	9.0	18,594 - 57,177
K	8,339 - 25,649	7,088 - 21,802	9.5	67,336 - 207,119
L	5,050 - 15,532	4,293 - 13,202	9.5	40,784 - 125,419
M	2,657 - 8,174	2,258 - 6,948	10.0	22,580 - 69,480
N	506 - 1,557	430 - 1,323	9.0	3,870 - 11,907
Total	26,156 - 80,450	22,233 - 68,383	9.45	210,102 - 646,219

Table 4. Estimated potential harvest of small salmon by Area at 55% fishing exploitation.

Area	Estimated Production of small salmon	Estimated Potential Harvest (No.)	Average Weight (lb.)	Estimated Potential Harvest (lb.)
A	26,501 - 81,152	14,576 - 44,838	4.5	65,590 - 201,769
B	92,010 - 282,988	50,606 - 155,643	4.5	227,725 - 700,395
C	24,557 - 75,530	13,506 - 41,542	4.5	60,779 - 186,937
D	3,473 - 10,681	1,910 - 5,875	4.5	8,596 - 26,435
E	1,461 - 4,491	804 - 2,470	4.5	3,616 - 11,115
F	933 - 2,869	513 - 1,578	4.5	2,309 - 7,101
G	8,401 - 25,839	4,621 - 14,211	4.5	20,792 - 63,951
H	13,433 - 41,316	7,388 - 22,724	4.5	33,247 - 102,257
I	13,911 - 42,785	7,651 - 23,532	4.5	34,430 - 105,893
J	47,882 - 147,268	26,335 - 80,997	4.5	118,508 - 364,488
K	16,407 - 50,460	9,024 - 27,753	4.5	40,607 - 124,889
L	38,373 - 102,489	21,105 - 56,369	4.5	94,973 - 253,660
M	15,470 - 47,580	8,509 - 26,169	4.5	38,288 - 117,761
N	6,842 - 21,042	3,763 - 11,573	4.5	16,934 - 52,079
Total	303,947 - 934,829	167,171 - 514,156	4.5	752,269 - 2,313,702

ADDENDUM I

Accessible parr rearing units for 33 streams in insular Newfoundland. (See Fig. 1).

River	Drainage Area (Mile ^{2})	Accessible rearing units
Highlands River	70.7	5,957
Crabbs River	212.6	22,044
Barachois River	93.0	10,042
Robinsons River	169.5	16,138
Journois Brook	24.9	1,042
Flat Bay Brook	245.4	19,153
Little Barachois Brook	136.8	8,498
Southwest and Bottom Brook	314.2	22,702
Harry's River	315.0	31,572
Romaines Brook	38.0	2,990
Fox Island River	75.0	7,845
Blanche Brook	47.9	3,755
Little Codroy River	86.4	4,689
Old Man's Brook	61.1	220
Grand Codroy River	369.0	32,354
Little Brook Ponds	29.2	261
Hughes Brook	51.1	1,536
Goose Arm River	81.9	2,366
Doctors Brook	30.5	639
Liverpool Brook	24.8	2,325
River of Ponds	332.5	5,404

Addendum I (Cont'd.)

River	Drainage Area (Mile ^{2})	Accessible rearing units
East River	52.6	5,485
Wild Cove Brook	31.1	160
Cook's Brook	21.1	1,799
Ryan's Brook	9.1	1,185
Fischells Brook	139.0	16,845
Salmonier River	99.2	8,275
Great Barasway Brook	26.2	1,176
Colinet	61.1	6,374
Gander River	2,470.0	190,900
West River (St. Barbe)	57.6	1,435
Garnish River	82.0	9,300
Sops Arm River (Main River)	404.7	20,500
Total	6,263.2	464,966

Number of rearing units per square mile = 74.2

ADDENDUM II

Smolt production per 100 yd^2 in four rivers in insular Newfoundland and one in Labrador. For each river smolt production was determined by dividing the annual smolt counts by the number of accessible parr rearing units in that system.

River	Range	Mean	No. of Years	Stock
Indian River	1.3-1.9	1.6	6	Native
Noel Paul Brook	1.5-1.9	1.7	2	Humber R. eggs
West River (St. Barbe)	4.0-8.4	6.7	5	Native
Sand Hill River (Labrador)	1.2-1.8	1.6	5	Native
Little Codroy R.[a]	1.6-3.1	2.1	10	Native

[a] Smolt escapement obtained from Murray, 1968.

There are a large number of ponds and lakes on West River which are suspected of being used for parr rearing.

There is also evidence on other river systems that lakes are used by parr for rearing purposes. Therefore, when estimating the production of smolt for insular Newfoundland it is reasonable to use 1.3-4.0 smolt per unit as a production factor.

REFERENCES

Murray, A.R. 1968. Smolt survival and adult utilization of Little Codroy River, Newfoundland, Atlantic salmon. J. Fish. Res. Bd. Canada. 25 (10) 2165-2218.

Pratt, J.D., G.M. Hare, and H.P. Murphy, 1974. Investigation of production and harvest of an Atlantic salmon population. Sand Hill River, Labrador. Resource Dev. Br. Nfld. Reg. Fish. Mar. Serv. Tech. Rept. No. NEW/T-74-1. p 27.

APPENDIX VIII.

ESTIMATED STOCK SIZES AT THE BEGINNING OF THE COMMERCIAL FISHERY AND ESTIMATED YIELDS TO THE COMMERCIAL FISHERY BASED ON ANGLING CATCHES

Stock sizes of Atlantic salmon at the beginning of the commercial fishery were calculated as follows. The estimated yields of small and large salmon are calculated as the yield from each statistical area (Fig. I) on the basis of the angling catches and angling exploitations during 1973, 74 and 75 in each area. On the basis of angling exploitation rates, the river run for each area is calculated by

$$N_n = \frac{C_n}{E(1-e^{-z})}$$

where N_n = Total River Run to Area.

C_n = Angling catch for each Area

$E\ (1-e^{-z})$ = Exploitation Rate in Rivers of each Area.

Then assuming differential levels of fishing and natural mortality rates for small and large salmon, the survival rates for each total mortality is calculated. This survival rate corresponds to the total run i.e. the number of small or large fish from that area which survives the commercial fishery. The stock sizes of small and large fish are then calculated as follows:

$$\text{Stock size} = \frac{\text{Number of survivors}}{\text{survival rate}}$$

Average whole weights for each area are then assigned to the numbers of small and large fish to arrive at the stock size in pounds. The fishing mortality rate (%) is then applied to arrive at the estimated yield from each area to the commercial fishery (Tables I-6).

The estimated yields (lbs.) of small and large salmon during 1973-75 that would be derived from Newfoundland and Labrador rivers are as follows:

	Newfoundland		Labrador		Total		Grand
	Small	Large	Small	Large	Small	Large	Total
1973	1,080,284	561,504	764,775	1,269,637	1,845,059	1,831,141	3,676,200
1974	1,013,544	400,168	442,143	1,425,124	1,455,683	1,825,292	3,280,975
1975	1,225,377	430,830	883,931	1,064,846	2,109,294	1,495,676	3,604,970

Assumptions:

1. All salmon which are destined to return to the river in that year are in the commercial fishery area and are subject to the same exploitation rates.
2. Angling exploitation rates for each statistical area (A to O) are estimated on the basis of 1973-75 angling catches and exploitation rates. These are estimated on the basis of numbers of fish entering various fishways and angling catches.
3. The angling exploitation rates in the rivers within each statistical area are equal.
4. Differential levels of fishing and natural mortality are assumed for small and large salmon.
5. Stock sizes of small and large salmon are calculated as follows:

$$\text{Stock size} = \frac{\text{number of survivors}}{\text{survival rate}} \text{ (numbers escaping into rivers)}$$

6. Fishing mortality rate is applied to arrive at the estimated yield in numbers from each area.
7. Average whole weights for each area are assigned to numbers of small and large fish, to arrive at stock size in pounds produced in each area.

Fig. I.

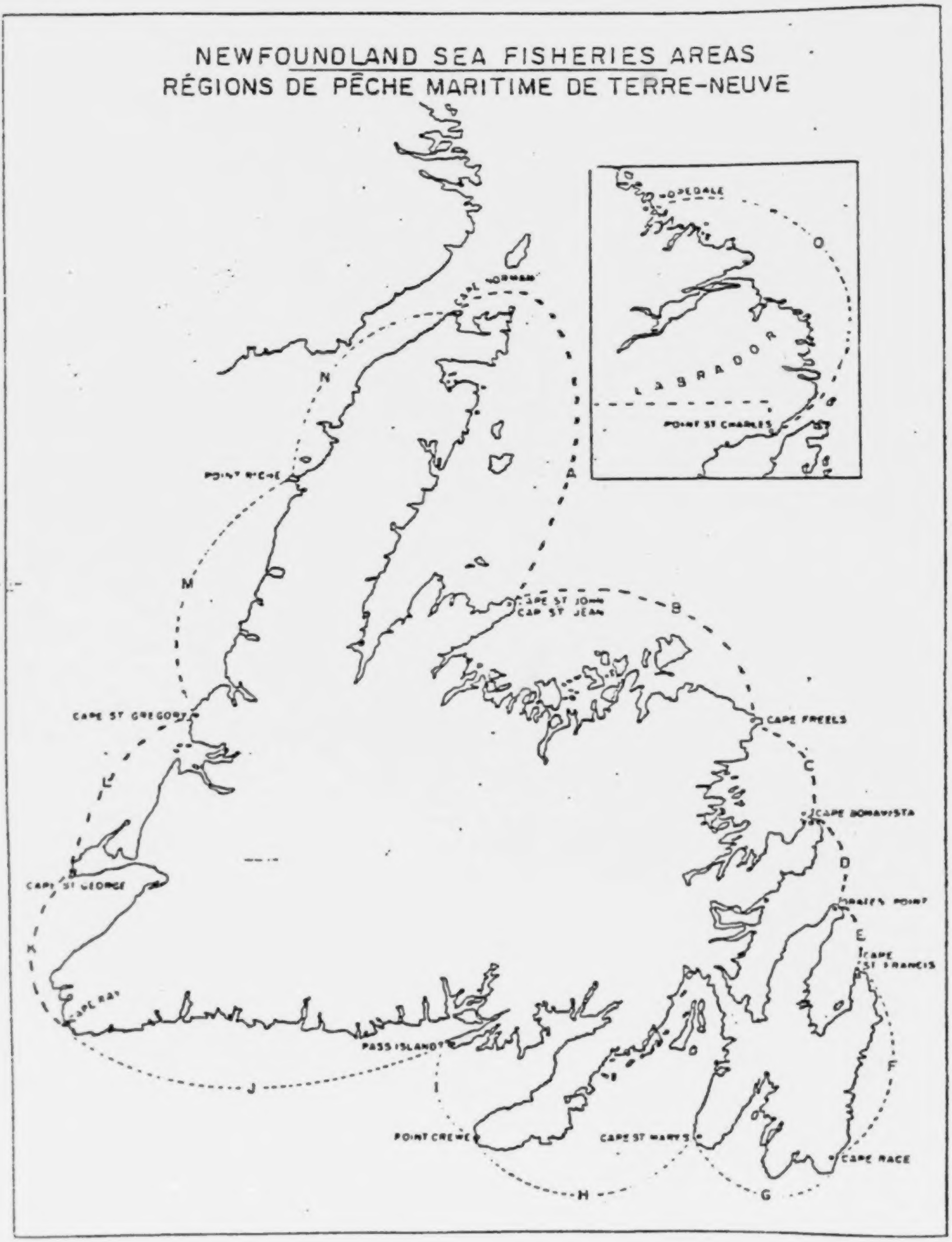
NEWFOUNDLAND SEA FISHERIES AREAS
RÉGIONS DE PÊCHE MARITIME DE TERRE-NEUVE
OPEDALE
O
LABRADOR
POINT ST CHARLES
B
CAPE NORMAN
N
A
POINT RICHE
M
CAPE ST JOHN
CAP ST JEAN
B
CAPE ST GREGORY
L
CAPE FREELS
C
CAPE BONAVISTA
D
GRATES POINT
E
CAPE ST FRANCIS
CAPE ST GEORGE
K
CAPE RAY
PASS ISLAND
J
I
F
POINT CREWE
CAPE ST MARYS
CAPE RACE
H
G

Table I. Estimated stock sizes and yields of small salmon in various areas based on 1973 angling catches.

Area	Angling Catch (No)	River Exploit-ation Rate $E(1-e^{-z})$	Total River Run	Stock Size (No)	Estimated yield from Area (No)	Aver. Wgt. (lbs)	Estimated yield from Area (lbs)
A	1238	10%	12,380	30,950	17,023	4.5	76,604
B	6380	20%	31,900	79,750	43,863	4.5	197,384
C	2111	25%	8,444	21,110	11,611	4.5	52,250
D	163	25%	652	1,630	897	4.5	4,037
E	131	25%	524	1,310	721	4.5	3,246
F	94	25%	376	940	517	4.5	2,327
G	2158	20%	10,790	26,975	14,836	4.5	66,762
H	1785	25%	7,140	17,850	9,818	4.5	44,181
I	1578	20%	7,890	19,725	10,849	4.5	48,821
J	4052	15%	27,013	67,533	37,143	4.5	167,144
K	6430	25%	25,720	64,300	35,365	4.5	159,143
L	3838	25%	15,352	38,380	21,109	4.5	94,991
M	2634	20%	13,170	32,925	18,109	4.5	81,491
N	2648	20%	13,240	33,100	18,205	4.5	81,923
Nfld.	35,240	20.2%	174,591	436,478	240,063	4.5	1,080,284
Lab.	6,180	5%	123,600	309,000	169,950	4.5	764,775
Total	41,420	13.9%	298,191	745,478	410,013	4.5	1,845,059

$$N = \frac{Cn}{E(1-e^{-z})}$$

	Annual	Inst.
Fishing Mortality	55% (a)	0.80 = log e (1-a)
Natural Mortality	10% (n)	0.11 = log e (1-n)
Total Mortality	60% (i)	0.91 = log e (1-i) = z
Survival Rate	40% = e^{-z}	

Table 4. Estimated stock sizes and yields of large salmon in various areas based on 1974 angling catches.

Area	Angling Catch (No)	River Exploitation Rate $E(1-e^{-z})$	Total River Run	Stock Size (No)	Estimated yield from Area (no)	Aver. Wgt. (lbs)	Estimated yield from Area (lbs)
A	4	8%	50	385	327	9.0	2,943
B	80	16%	500	3,846	3,269	9.0	29,421
C	21	20%	105	808	687	9.0	6,183
D	1	20%	5	38	32	9.0	288
E	2	20%	10	77	65	9.0	585
F	0	0	0	0	0	0	0
G	9	16%	56	431	366	9.0	3,294
H	14	20%	70	538	457	9.0	4,113
I	9	20%	45	346	294	9.0	2,646
J	42	12%	350	2,692	2,288	9.0	20,592
K	744	20%	3,720	28,615	24,323	9.5	231,069
L	172	20%	860	6,615	5,623	9.5	53,419
M	98	16%	613	4,715	4,008	10.0	40,080
N	15	16%	94	723	615	9.0	5,535
Nfld.	1211	18.7%	6,478	49,831	42,356	9.45	400,168
Lab.	803	3.5%	22,943	176,485	150,013	9.5	1,425,124
Total	2014	6.9%	29,421	226,315	192,368	9.49	1,825,292

$$N = \frac{C_n}{E(1-e^{-z})}$$

	Annual	Inst.
Fishing Mortality	85% (a)	1.90 = log e (1-a)
Natural Mortality	10% (n)	0.11 = log e (1-n)
Total Mortality	87% (i)	2.01 = log e (1-i)
Survival Rate	13% = e^{-z}	

Table 2. Estimated stock sizes and yields of large salmon in various areas based on 1973 angling catches.

Area	Angling Catch (No)	River Exploit-ation Rate $E(1-e^{-z})$	Total River Run	Stock Size (No)	Estimated yield from Area (No)	Aver. Wgt. (lbs)	Estimated yield from Area (lbs)
A	2	10%	20	154	131	9.0	1,179
B	47	20%	235	1,808	1,537	9.0	13,833
C	13	25%	52	400	340	9.0	3,060
D	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
F	4	25%	16	123	105	9.0	945
G	20	25%	80	615	523	9.0	4,707
H	42	20%	210	1,615	1,373	9.0	12,357
I	16	25%	64	492	418	9.0	3,762
J	48	15%	320	2,462	2,093	9.0	18,837
K	1017	20%	5,085	39,115	33,248	9.5	315,856
L	372	25%	1,488	11,446	9,729	9.5	92,426
M	195	25%	780	6,000	5,100	10.0	51,000
N	148	20%	740	5,692	4,838	9.0	43,542
Nfld.	1924	21.2%	9,090	69,923	59,435	9.45	561,504
Lab.	1022	5%	20,440	157,231	133,646	9.5	1,269,637
Total	2946	10.0%	29,530	227,154	193,081	9.48	1,831,141

$$N - \frac{C_n}{E(1-e^{-z})}$$

	Annual	Inst.
Fishing Mortality	85% (a)	1.90 = log e (10a)
Natural Mortality	10% (n)	0.11 = log e (1-n)
Total Mortality	87% (i)	2.01 = log e (1-i)
Survival Rate	13% = e^{-z}	

Table 3. Estimated stock sizes and yields of small salmon in various areas based on 1974 angling catches.

Area	Angling Catch (No)	River Exploitation Rate $E(1-e^{-z})$	Total River Run	Stock Size (No)	Estimated yield from Area (no)	Aver. Wgt. (lbs)	Estimated yield from Area (lbs)
A	887	8%	11,088	27,720	15,246	4.5	68,607
B	5373	16%	33,581	83,953	46,174	4.5	207,783
C	1637	20%	8,185	20,463	11,255	4.5	50,648
D	303	20%	1,515	3,788	2,083	4.5	9,374
E	133	20%	665	1,663	915	4.5	4,118
F	51	20%	255	638	351	4.5	1,580
G	1484	16%	9,275	23,188	12,753	4.5	57,389
H	1212	20%	6,060	15,150	8,333	4.5	37,499
I	1453	20%	7,265	18,163	9,990	4.5	44,955
J	3681	12%	30,675	76,688	42,178	4.5	189,801
K	4320	20%	21,600	54,000	29,700	4.5	133,650
L	2867	20%	14,335	35,838	19,711	4.5	88,700
M	1300	16%	8,125	20,313	11,172	4.5	50,274
N	1789	16%	11,181	27,953	15,374	4.5	69,183
Nfld.	26,490	16.2%	163,805	409,513	225,232	4.5	1,013,544
Lab.	2,501	3.5%	71,457	178,643	98,254	4.5	442,143
Total	28,991	12.3%	235,262	588,155	323,485	4.5	1,455,683

$$N = \frac{Cn}{E\,(1-e^{-z})}$$

	Annual	Inst.
Fishing Mortality	55% (a)	0.80 = log e (1-a)
Natural Mortality	10% (n)	0.11 = log e (1-n)
Total Mortality	60% (i)	0.91 = log e (1-i)
Survival rate	40%	$= e^{-z}$

Table 5. Estimated stock sizes and yields of small salmon in various areas based on 1975 angling catches.

Area	Angling Catch (No)	River Exploitation Rate $E(1-e^{-z})$	Total River Run	Stock Size (No)	Estimated yield from Area (no)	Aver. Wgt. (lbs)	Estimated yield from Area (lbs)
A	1153	10%	11,530	28,825	15,854	4.5	71,343
B	5943	15%	39,620	99,050	54,478	4.5	245,151
C	1988	20%	9,940	24,850	13,668	4.5	61,506
D	94	20%	470	1,175	646	4.5	2,907
E	40	20%	200	500	275	4.5	1,238
F	87	20%	435	1,088	598	4.5	2,691
G	1867	15%	12,447	31,118	17,115	4.5	77,018
H	427	15%	2,847	7,118	3,915	4.5	17,618
I	975	20%	4,875	12,188	6,703	4.5	30,164
J	4770	15%	31,800	79,500	43,725	4.5	196,763
K	5771	20%	28,855	72,138	39,676	4.5	178,542
L	6232	20%	31,160	77,900	42,845	4.5	192,803
M	2056	20%	10,280	25,700	14,135	4.5	63,608
N	2716	20%	13,580	33,950	18,673	4.5	84,029
Nfld.	34,119	17.2%	198,039	495,100	272,306	4.5	1,225,377
*Lab.	5,000	3.5%	142,857	357,143	196,429	4.5	883,931
Tot.	39,119	11.5%	340,896	852,240	468,732	4.5	2,109,294

* Labrador figures are provisional.

$$N = \frac{C_n}{E(1-e^{-z})}$$

	Annual	Inst.
Fishing Mortality	55% (a)	0.80 = log e (1-a)
Natural Mortality	10% (n)	0.11 = log e (1-n)
Total Mortality	60% (i)	0.91 = log e (1-i)
Survival Rate	40% = e^{-z}	

Table 6. Estimated stock sizes and yields of large salmon in various areas based on 1975 angling catches.

Area	Angling Catch (No)	River Exploit-ation Rate $E(1-e^{-z})$	Total River Run	Stock Size (No)	Estimated yield from Area (no)	Aver. Wgt. (lbs)	Estimated yield from Area (lbs)
A	0	0	0	0	0	0	0
B	166	15%	1107	8,515	7,238	9.0	65,142
C	23	20%	115	885	752	9.0	6,768
D	1	20%	5	38	32	9.0	288
E	0	0	0	0	0	0	0
F	0	0	0	0	0	0	0
G	6	15%	40	308	262	9.0	2,358
H	9	15%	60	462	393	9.0	3,537
I	4	20%	20	154	131	9.0	1,179
J	121	15%	807	6,208	5,277	9.0	47,493
K	756	20%	3780	29,077	24,715	9.5	234,793
L	130	20%	650	5,000	4,250	9.5	40,375
M	74	20%	370	2,846	2,419	10.0	24,190
N	16	20%	80	615	523	9.0	4,707
Nfld.	1306	18.6%	7,034	54,108	45,992	9.37	430,830
*Lab.	600	3.5%	17,143	131,869	112,089	9.5	1,064,846
Total	1906	7.9%	24,177	185,977	158,080	9.46	1,495,676

* Labrador figures are provisional.

$$N = \frac{C_n}{E(1-e^{-z})}$$

	Annual	Inst.
Fishing Mortality	85% (a)	1.90 = log e (1-a)
Natural Mortality	10% (n)	0.11 - log e (1-n)
Total Mortality	87% (i)	2.01 = log e (1-i)
Survival Rate	13% = e^{-z}	

APPENDIX IX.

Methodology used to estimate the gains of Atlantic Salmon to Maritimes and Quebec homewaters resulting from changes made to reduce interception in the Newfoundland commercial fishery.

INTRODUCTION

The methodology presented here was used to estimate the gain (in numbers of fish and weight) to homewaters that would be derived from proposed regulation changes aimed at reducing the rate of interception of Maritimes and Quebec origin salmon in the Newfoundland commercial fishery. The methodology was designed to facilitate assessment of options considered in this report and others developed at a later date. Assumed values of the different parameters are also presented.

GENERAL METHODOLOGY AND ASSUMPTIONS

The method employs tag return information in conjunction with catch statistics to estimate the level and distribtuion in time and by area of interception of Maritimes and Quebec origin salmon by the commercial fishery in Newfoundland. Since detailed biological information was sketchy, stocks were grouped according to likeness and by geographical area. Analyses conducted depict minimum estimates of interception of Maritimes and Quebec origin salmon by the Newfoundland commercial fisheries since lack of data prevented the inclusion of estimates for interceptions of most previous spawners and production from some Quebec stocks. Estimates pertain to the period 1969 to 1975 in the Newfoundland fishery and therefore represent averages for that time period.

Stock Grouping in the Analysis

Stocks were grouped in analyses according to likeness and by geographical area.

(i) Quebec Gaspé and upper north shore - stocks originating from rivers on Anticosti Island, along the lower north shore of Quebec and draining into Ungava Bay were excluded from the analyses as data was not available to facilitate estimation of the levels of contribution to the Newfoundland fishery.

(ii) Restigouche River system, New Brunswick

(iii) Miramichi River system, New Brunswick

(iv) Minor rivers of the Maritimes Region in the Gulf of St. Lawrence - included all Nova Scotia, Prince Edward Island and New Brunswick rivers that drain into the Gulf of St. Lawrence except those which are part of the Restigouche and Miramichi river systems.

(v) Nova Scotia Atlantic Coast Rivers - included all rivers on the Atlantic coast of Nova Scotia.

(vi) Bay of Fundy Rivers - included all Nova Scotia and New Brunswick rivers that drain into the Bay of Fundy except inner Fundy rivers such as Big Salmon and Stewiacke, which according to smolt tagging information do not contribute to fisheries outside the Bay of Fundy (Unpublished data, J.A. Ritter, Department of Fisheries and Oceans of Canada, Halifax, Nova Scotia).

Application of Tag Return Information

Estimates of the numbers of salmon of a particular stock or grouping of stocks were determined using tag return information from releases of both hatchery-reared and wild Atlantic salmon smolts released in the years 1968 to 1973. Releases of hatchery-reared smolts utilized in the analysis were confined to smolt groups released in their native stream or nearby river. Data for releases in streams distant from the native river of the smolts were excluded from analyses as salmon under these conditions were assumed to have atypical migration patterns (Ritter 1975). Migration timing, ocean distribution and harvest rates were assumed to represent the stock rather than the river into which the releases were made.

Tag return information was employed in analyses in the following manner:

(i) To estimate the number and weight of salmon of Maritimes and Quebec origin taken in the Newfoundland fishery. The numbers of salmon of different groupings of stocks and sea-age classes taken in the Newfoundland fishery were determined by using ratios of tagged (v) to tagged plus untagged fish (u) in homewaters (H) to estimate the numbers of fish taken in Newfoundland (N), i.e., to estimate N_u the following relationship was applied.

$$N_u = \frac{N_v\ (H_u)}{(H_v)}$$

The ratios in homewaters were generally developed using sport fishery catches or counts at monitoring traps. For some groups, particularly hatchery fish, the relative proportions of tags recovered or present in the home river and in Newfoundland were used in place of absolute numbers of tags. The proportions (rather than absolute numbers of tags) were used where it was noted that the hatchery fish varied in age at first maturity from the wild fish they represented in the analysis. For instance, large hatchery smolts originating from a stock (St. John, New Brunswick) that produced grilse and multi-sea -winter salmon in almost equal proportions are producing considerably higher proportions of grilse (Ritter and Carey 1980).

The proportions developed for some lots of hatchery smolts were dependent upon a division of the adult stock into fish that either did or were destined to mature as 1-sea-winter salmon and fish that did or were destined to mature as multi-sea-winter salmon. The main area of contention in the division of a stock into the two distinct maturity classes lay with the 1-sea-winter salmon taken in the Newfoundland fishery. For this separation, each stock or grouping of stocks was treated separately and on the basis of time and location of recapture in the Newfoundland fishery, the 1-sea-winter salmon were designated as maturing or non-maturing. An ocean migration speed of 32 kilometres per day (equivalent to 20 miles per day) was assumed in these determinations (Personnel communication, H. Lear, Department of Fisheries and Oceans of Canada, St. John's, Newfoundland).

When tag returns were combined for fish of different sea-ages in the development of their proportionate distribution in fisheries and spawning escapements, the numbers of tag recaptures for different sea-age classes were adjusted for differential tag loss rates. Based on data presented by Gray (1973) and subsequent analyses of similar data (Unpublished data, J.A. Ritter), tag loss rates (c_e) of 0.35, 0.45 and 0.55 were assumed for 1-, 2- and 3-sea-winter salmon, respectively.

For sets of tag return data for which counting trap information depicting river escapements was used in analyses, tag returns in fisheries were adjusted for a non-reporting by fishermen of tags they recovered. A non-reporting rate (c_r) of 0.30 (i.e., 3 tags out of every 10 recovered in fisheries) was assumed for tag recoveries in all fisheries. For smolt releases for which spawning escapements were not determined directly from trap counts, the non-reporting correction factor was not used because escapements were estimated from the sport catch. For these latter groups it was assumed that the sport fishery took a percentage of the bright salmon entering the freshwater portions of the river . The percentage assumed (i.e., the efficiency of the sport fishery) varied from one river to another with estimates of efficiency being determined independently by such methods as adult tagging studies.

(ii) To estimate the distribution of salmon in time and location in the Newfoundland fishery according to stock grouping, sea-age class and maturity status (i.e., maturing or non-maturing). The tag recaptures in the Newfoundland fishery were used to apportion according to stock and sea-age the estimated harvests of Maritimes and Quebec origin salmon in the Newfoundland fishery by Statistical Area and week. Maturity status was estimated according to time and location in the fishery and assuming an ocean migration speed of 32 kilometers per day. Tag recaptures for which either date and/or location in the fishery were unknown were excluded from this part of the analysis. Average weights of salmon of different sea-age classes, derived from a sampling of the Newfoundland catch (Lear and May 1972), were used to convert number of fish to weight landed (kg) by Statistical Area and week.

(iii) To estimate the re-distribution of Maritimes and Quebec origin salmon expected to occur with imposition of a regulatory option to reduce interception. The sequential steps considered in determining the impact of regulatory options are as follows:

- the number of salmon of the different stocks affected or initally not harvested as a result of a regulation change depends upon the fishing time and area encompassed by the regulation change;

- the affected fish either esacape the Newfoundland fishery or are harvested in the subsequent time interval and/or adjacent Area not encompassed by the regulation change;

- Quebec and Maritimes salmon escaping the Newfoundland fishery were assumed to be either maturing and westbound or non-maturing and northbound;

- a portion of the affected salmon escaping the Newfoundland fishery succumb to natural mortality prior to entering another fishery or their respective home rivers;

- affected salmon northbound and escaping the Newfoundland fishery were assumed to be too late to enter the Greenland fishery that same year (based on adult tagging studies in the sea along the coast of Newfoundland, personal communication, H. Lear); and

- affected salmon northbound and escaping the Newfoundland fishery were asssumed to be re-distributed among fisheries (excluding the Greenland fishery in the same year) and the home river in the same proportion as the remaining fish in the sea of that particular stock or stock grouping and as estimated from tag recapture information.

Following identification of westbound (maturing) and northbound (non-maturing) salmon affected by regulation change, the numbers of affected fish that would be harvested in adjacent Statistical Areas and weekly time intervals not encompassed by the regulation change were estimated. Exploitation rates for west- and northbound salmon escaping from a particular Area were based on recapture data from adult tagging studies in the sea (personal communication, H. Lear), and smolt tagging investigations in Maritimes and Quebec rivers (Table 1). The numbers of affected fish harvested enroute through the Newfoundland fishery were estimated assuming a travel rate of 32 kilometers per day and utilizing exploitation rates given in Table 1. The affected fish escaping the Newfoundland fishery west and north were determined by subtracting the harvested numbers from the numbers of fish initially affected by the regulation change.

Affected fish escaping west and north from the Newfoundland fishery were re-distributed among the different fisheries and to the home river using tag recapture data adjusted for natural mortality. Monthly natural mortality rates of 0.04 for each of the winter months January, Feburary and March, and 0.01 for the other months were assumed. Doubleday et al (1980) suggest that monthly natural mortality rates for North Atlantic salmon in the sea, 1-sea-winter and older, lie between 0.005 and 0.01.

Numbers of fish re-distributed to Maritimes and Quebec homewaters were converted to weight by applying mean weights in homewaters according to stock origin and sea-age class. Mean weights of salmon in homewaters were available from ongoing biological sampling programs in Maritimes and Quebec rivers.

DETAILED METHODOLOGY

Maritimes and Quebec origin salmon re-distributed through regulation changes to the Newfoundland commercial salmon fishery were estimated through separation and treatment of the affected fish according to stock or grouping of stocks, sea-age and maturity status. For a particular stock and depending upon the complexity of it, analyses were conducted on five or less sea-age and maturity classes. Potential gains to Maritimes and Quebec homewaters were estimated in terms of numbers of fish and weight.

I IMPACT IN NUMBERS OF FISH GAINED

Maturing 1-sea-winter Salmon

The numbers of maturing 1-sea-winter salmon arriving in Maritimes and Quebec homewaters as a result of regulation changes to the Newfoundland fishery to reduce the rate of interception were determined through use of the following expressions.

$$A = A_1 + A_2 + A_3 + \text{--------}$$

$$A_1 = n_1 \, [1-r_1ta_1)+(1-r_1ta_1)(1-r_2ta_2)+(1-r_1ta_1)(1-r_2ta_2)(1-r_3ta_3)+\text{-----}] \, e^{-m_1t_1}$$

where, A = number of maturing 1-sea-winter salmon arriving in homewaters subsequent to escaping the Newfoundland area as a result of a regulation change. A_{1--n} represent the numbers of fish that originate from individual Statistical Areas and weekly time intervals.

n_{1--n} number of maturing 1-sea-winter salmon of a mainland stock or grouping of stocks, in individual Statistical Areas and weekly time intervals, affected by the regulation change.

r_{1--n}= the exploitation rate on the affected fish in different Statistical Areas; this varies with the Statistical Area and its location relative to the Statistic Area from which the fish were initally released as a result of the regulation change (see Table 1).

ta= the proportion of the time that fish released by the regulation change are subjected to exploitation.

$ta=1-\frac{t_r}{t_f}$ where, $ta \geq o$ and ≤ 1; if ta is negative, ta=o.

t_f= time to travel through the Statistical Area assuming a travel speed of 32 kilometers per day. t_f is assumed to equal zero in the Statistical Area from which the fish were released by the regulation change.

t_r= the proportion of the time that the regulation is in effect while the affected fish (n_1) are in the Statistical Area.

m_1= monthly natural mortality rate assumed to be 0.01; natural mortality rate applied only to the fish escaping the Newfoundland area.

t_1= time in months from time fish initially released from the Newfoundland fishery (i.e., when affected) to time of arrival in Maritimes and Quebec homewaters.

Maturing 2- and 3- sea-winter salmon

The numbers of maturing 2-sea-winter (B) and 3-sea-winter salmon (C) arriving in Maritimes and Quebec homewaters subsequent to being released from the Newfoundland area were estimated by the same methodology outlined for the maturing 1-sea-winter salmon (A).

Non-Maturing 1-sea-winter salmon

The following expressions were used to estimate the numbers of salmon of different sea-ages arriving in homewaters as a result of regulation changes made to the Newfoundland fishery. Salmon of different sea-ages arriving in homewaters as estimated by the following methodology all stem from the non-maturing 1-sea-winter salmon released from the fishery.

$$D = D_1 + D_2 + D_3 + -----$$

$$D_1 = d_1 \left[(1-r_1ta_1)+(1-r_1ta_1)(1-r_2ta_2)+(1-r_1ta_1)(1-r_2ta_2)(1-r_3ta_3)+\text{----} \right] e^{-(m_1t_1+m_2t_2)}$$

where, D = number of non-maturing 1-sea-winter salmon escaping the Newfoundland fishery as a result of a regulation change. D_{1--n} represent the numbers of fish that originated from different Statistical Areas and time intervals, available in the sea at a specific time after the Newfoundland fishery, before or at the onset of another fishery that the affected fish are assumed to encounter. Since fish released from the Newfoundland fishery would not be harvested in the Greenland fishery in the same year (based on adult tagging studies in the Newfoundland area, H. Lear, personal communication), the expression D was calculated to represent the number of affected fish available in the sea at the onset of the Newfoundland fishery on 2-sea-winter salmon the next year. Monthly natural mortality rates of 0.01 (m_1) and 0.04 (m_2) were assumed; the 0.04 rate was applied to the months January, February and March and the 0.01 rate to all other months.

The distribution of the fish available in the sea at time of the Newfoundland fishery on 2-sea-winter salmon were defined from the proportionate distribution of tagged salmon as shown in Table 2. The absolute numbers expected in the different fisheries and the river were determined as follows:

Number of non-maturing 1-sea-winter salmon harvested as 2-sea-winter salmon in the Newfoundland fishery $= D \cdot p_{N_2} \cdot i_1$

where, D = number of non-maturing 1-sea-winter salmon escaping the Newfoundland fishery as a result of regulation change and available in the sea at time of harvest of 2-sea-winter salmon in the Newfoundland fishery.

p_{N_2} = the proportion of the stock available in the sea that would have been harvested as 2-sea-winter salmon in Newfoundland had the rate of interception not been reduced (see Table 2 for relative harvest proportions before reduction in interception).

i_1 = the relative proportion to which the rate of interception of 2-sea-winter-salmon in Newfoundland was reduced i.e., i_1 = number harvested after reduction divided by the number harvested before reduction in interception.

Number of 2-sea-winter salmon escaping the Newfoundland fishery as a result of reduction in rate of interception (this applies only to the re-distributed non-maturing 1-sea-winter salmon) $= D \cdot p_{N_2} (1-i_1)$

$$= g_1 + h_1$$

where, g_1 equals the number of maturing 2-sea-winter salmon and h_1 the number of non-maturing 2-sea-winter salmon escaping the fishery. This division of maturing and non-maturing 2-sea-winter salmon was based on relative proportions of the same determined for the original 2-sea-winter salmon affected by and escaping the Newfoundland fishery. Maturity status of the original 2-sea-winter salmon was based on time and location of captive in the fishery.

Number of maturing 2-sea-winter salmon arriving in Maritimes or Quebec homewaters $= g_1 \cdot e^{-m_1t_1}$

Number of non-maturing 2-sea-winter salmon available at the time of the Newfoundland fishery for 3-sea-winter salmon $= h_1 \cdot e^{-(m_1t_1+m_2t_2)}$

The destination of the non-maturing 2-sea-winter salmon as 3-sea-winter salmon was determined from tag return information and according to the methodology shown in Table 2.

Number harvested as 3-sea-winter salmon in the Newfoundland fishery $= h_1 \cdot p_{N_3} \, i_2 \cdot e^{-(m_1t_1+m_2t_2)}$

where, i_2 equals the proportion to which the rate of interception of 3-sea-winter salmon in the Newfoundland fishery was reduced.

Number of 3-sea-winter salmon escaping the Newfoundlang fishery as a result of reduction in the rate of interception $= h_1 \cdot p_{N_3} \, (1-i_2)e^{-(m_1t_1+m_2t_2)}$

The 3-sea winter salmon escaping the Newfoundland fishery would be maturing and with their number being reduced only by natural mortality they would be distributed between mainland miscellaneous fisheries and the mainland river according to the relative proportion of each as determined by methodology shown in Table 2.

The number of non-maturing 1-sea-winter salmon designated to be harvested at West Greenland as 2-sea-winter salmon was estimated using the tag return information and methodology shown in Table 2.

Number harvested as 2-sea-winter salmon at West Greenland $= D \cdot p_{G_2} \cdot \frac{1}{2} \cdot e^{-(m_1t_1+m_2t_2)}$

where, $p_{G_2} \cdot \frac{1}{2}$ equals the proportion of the stock available in the sea that is designated to be harvested as 2-sea-winter salmon in West Greenland. p_{G_2} is the proportion calculated from tag return information which applies to a Greenland fishery generally exceeding 2 000 tonnes. Since th present quota and recent catches have been roughly half the earlier catches (i.e., the quota is 1190 tonnes), the proportion designated to the West Greenland fishery was reduced by 50% (i.e., multiplied by $\frac{1}{2}$).

The fish not harvested in the West Greenland fishery were re-distributed as 3-sea-winter salmon in the same manner as described previously for non-maturing 2-sea-winter salmon re-distributed from the Newfoundland fishery.

The number of non-maturing 1-sea-winter salmon designated to be harvested in Newfoundland as 3-sea-winter salmon was estimated using tag return information and the methodology shown in Table 2.

Number harvested as 3-sea-winter salmon in Newfoundland $= D \cdot p_{N_3} \cdot i_3 \cdot e^{-(m_1 t_1 + m_2 t_2)}$

The number of 3-sea-winter salmon displaced from the Newfoundland fishery would be re-distributed to the mainland miscellaneous fisheries and mainland river according to their relative proportions as estimated from tag return information.

The numbers of non-maturing 1-sea-winter salmon designated to return as 2-sea-winter and 3-sea-winter salmon to the mainland miscellaneous fisheries and mainland river were estimated as follows:

Number harvested as 2-sea-winter salmon in mainland miscellaneous fisheries $= D \cdot p_{M_2} \cdot e^{-(m_1 t_1 + m_2 t_2)}$

Number returning to mainland river as 2-sea-winter salmon $= D \cdot p_{R_2} \cdot e^{-(m_1 t_1 + m_2 t_2)}$

Number harvested as 3-sea-winter salmon in mainland miscellaneous fisheries $= D \cdot p_{M_3} \cdot e^{-(m_1 t_1 + m_2 t_2)}$

and,

Number returning as 3-sea-winter salmon to mainland river $= D \cdot p_{R_3} \cdot e^{-(m_1 t_1 + m_2 t_2)}$

Non-maturing 2-sea-winter salmon

The destination of the non-maturing 2-sea-winter salmon (E) escaping the Newfoundland area as a result of a reduction in the rate of interception was determined by methodology similar to that described for the non-maturing 1-sea-winter salmon (D).

II IMPACT IN WEIGHT OF FISH GAINED

The weight of all salmon released to homewaters (that includes to mainland miscellanewous fisheries and mainland river) was determined by using mean weights for salmon in homewaters separated according sea-age and stock. Mean weights utilized were from ongoing biological sampling programs in Maritimes and Quebec rivers.

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Table 1. Exploitation rates (r) for salmon of Martimes and Quebec origin released from the different Statistical Areas in the Newfoundland fishery. Rates based on driftnet tagging and recapture data provided by H. Lear, personal communication, and smolt tagging and recapture data for Maritimes and Quebec salmon stocks.

RELEASED FROM AREA	EXPLOITATION RATES (r) 0	A	B	C	D	E	F	G	H	I	J	K
0												
A	0 (0.15)[1]		0.20	0.15	0.05	0	0.05	0	0.05	0	0.05	0
B	0 (0.15)[1]	0.20		0.15	0.05	0	0.05	0	0.05	0	0.05	0
C	0 (0.10)[1]	0.20	0.15		0.05	0	0.05	0	0.05	0	0.05	0
D	0 (0.05)[1]	0.10	0.10	0.10		0.05	0.05	0	0.05	0	0.05	0
E	0	0.05	0.05	0.01	0.05		0.05	0	0.05	0	0.05	0
F	0	0.05	0.05	0.05	0.05	0.05		0	0.10	0	0.10	0
G									0.10	0	0.10	0
H										0	0.15	0
I											0.15	
J												0
K												

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[1] Numbers in parentheses represent alternative exploitation rates for Area 0 assumed for salmon of Quebec origin.

Table 2. Methodology used to estimate the destination in fisheries and the home river for non-maturing salmon escaping the Newfoundland fishery as a result of regulation changes. Data shown here are not representative of any individual stock or grouping of stocks.

Fishery and Age Class		Tagged Salmon [a] of Designated Age Class Available at Time of Fishery								
		N_2					N_3			
Designation	Description	No.	Prop'n[b]	M_2	R_2	G_2	No.	Prop'n[b]	M_3	R_3
N_2	Newfoundland, 2SW	50	0.244							
M_2	Mainland Miscel.,2SW	5.0	0.024	5						
R_2	Mainland River[c],2SW	101.0	0.493		100					
G_2	Greenland, 2Sw	5.2	0.026			5				
N_3	Newfoundland, 3SW	6.2	0.030			6.0	5	0.142		
M_3	Mainland Miscel.,3SW	6.2	0.030			6.0	5.0	0.142	5	
R_3	Mainland River[c], 3SW	31.2	0.153			30.2	25.3	0.716		25
Mid date of capture/presence:		June 1		June15	July1	Sept1	June1		June15	July1

---

[a] Numbers of tagged salmon shown in this table have previously been adjusted for differential tag loss(c_e) and non-reporting of tags recovered in fisheries (c_r). Relative distribution of adjusted tag returns is representative of the estimated distribution of salmon of different sea age classes (designated by sea-winters, i.e., SW) in various fisheries.

[b] Proportionate distributions of tagged salmon (p) represent the estimated distribution relative to destination in fisheries and home river for salmon of a particular stock at a designated time in their sea-life.

[c] Number of tag recaptures in Mainland River (R) include tags recovered in the commercial fisheries in and near the river (n), in the sport fishery (a), in other fisheries such as the native food fishery (O) and in the spawning escapement (s),

$$\text{i.e., } R = \left[(n + a + o) \left(\frac{1}{1-c_r}\right) + s \right] \left[\frac{1}{1-c_e} \right]$$

APPENDIX X.

Determination of Catch by Week of Maritimes origin salmon

In order to arrive at a weight of the salmon catch for each stock grouping in each Newfoundland Statistical Area by week, several steps had to be taken. We will use the Miramichi wild smolt tagging studies to explain the method.

(i) First it was necessary to determine the total number of 1- and 2- sea-winter salmon being harvested in Newfoundland waters in a representative period that were of Miramichi origin. Tagging data and detailed commercial catch data from Newfoundland were essential. The 1971 to 1973 wild smolt tagging data (after ban transition year) were used as well as the 1972 to 1975 Miramichi angling data. Using these data we utilized a simple ratio formula to estimate catches in Newfoundland. (Non-reporting rates in the Miramichi angling fishery & in the Nfld. commercial fishery were assumed to be equal.)

Exploitation rates, necessary for calculations were estimated separately for 1- and 2- sea-winter salmon in the home angling and Nfld. commercial fisheries. Next, average angling catches per year were calculated for 1- & 2- sea-winter Miramichi salmon for the period corresponding with the tag return years to the Miramichi. Using the principle that we now know exploitation rate and actual numbers harvested in the sport catch and the exploitation rate in the Newfoundland commercial fishery on both 1- or 2- sea-winter salmon according to the following relationship:

$$\frac{\text{Miramichi angling exploitation (1- or 2- s-w)}}{\text{Average total no. angled (1-2- s-w)}} = \frac{\text{Nfld. commercial exploitation rate}}{X}$$

where X = no. of 1- or 2- sea-winter salmon of Miramichi origin caught in Nfld. fishery.

(ii) From these numbers, total weight of Miramichi salmon could them be calculated using average weights decided upon in Appendix 4.

(iii) Miramichi caught fish then had to be distributed within areas from which tag returns were recorded. To do this, all wild smolt tag returns in Newfoundland from the 1968 to 1974 tagging years were first distributed according to area of recapture. One and 2- sea-winter tagged salmon were treated separately. Tags with insufficient information to assign by area were rejected and it was assumed that the tag returns which were not usable were randomly distributed within the Nfld. areas.

Total tag returns for all areas were equal to 100 percent, then the appropriate percentage for each Area was calculated. (Table 2 and 3) With these calculated percentages the total numbers or weight of Miramichi salmon could be apportioned according to Area. It was assumed that tagged and untagged fish were similarly distributed.

(iv) After distributing the Miramichi caught fish by area, it was then necessary to distribute them by week within the respective Areas. Tag returns were tabulated according to week of recapture by Area, totalled, and converted to percent recapture per week (Table 4 and 5). Area totals of Miramichi salmon were then apportioned by week utilizing the calculated weekly percentages. Standard weeks were employed. Any tags with insufficient timing data to assign them to a recapture week were disregarded and it was assumed that tags with incomplete data were randomly distributed by Area and by week. One and 2- sea-winter salmon were dealt with individually.

TABLE 2. Recaptures of 1-sea-winter salmon in Newfoundland from wild Miramichi smolt tagging (1968-1974) distributed according to statistical Area

STATISTICAL AREA	TOTAL TAG RETURNS FROM EACH AREA	PERCENT RETURNS FROM EACH AREA (%)
A	57	32.9
B	27	15.6
C	16	9.2
D	22	12.8
E	10	5.8
F	8	4.6
G	2	1.2
H	17	9.8
I	5	2.9
J	8	4.6
K	0	0
O	1	0.6
TOTALS	173	100.0

TABLE 3. Recaptures of 2-sea-winter in Newfoundland from wild Miramichi smolt tagging (1968 to 1974) distributed according to statistical Area

STATISTICAL AREA	TOTAL TAG RETURNS FROM EACH AREA	PERCENT RETURNS FROM EACH AREA (%)
A	6	5.7
B	8	7.5
C	19	17.7
D	10	9.3
E	6	5.7
F	5	4.6
G	0	0
H	4	3.8
I	1	0.9
J	44[1]	41.1
K	1	0.9
O	3	2.8
TOTALS	107	100.0

[1] 21 tags were actually added to Area "J" as a result of analysis of non-reporting (H. Lear, Appendix 3)

TABLE 4. Percentage distribution of 1-sea-winter tag returns from Miramichi wild smolt tagging (1968-74) by week, by Nfld. Statistical Area. Each Area total % may vary slightly from 100% because of rounding.

WEEK	STATISTICAL AREA											
	A	B	C	D	E	F	G	H	I	J	K	O
1												
2												
3												
4	1.8				10	12.5		11.8				
5	1.8	7.4			10	-		-		12.5		
6	8.8	11.1	18.8	13.6	20	12.5		5.9	20	12.5		
7	7.0	7.4	12.5	13.6	10	50		17.6	20	37.5		
8	17.5	22.2	25.0	13.6	10	12.5	100	41.2	20	12.5		
9	24.6	29.6	18.8	31.8	30			17.6	20	12.5		
10	10.5	11.1	18.8	9.1	10			5.9	20	12.5		
11	15.7	7.4	-	4.5								
12	-	-	6.3	-								
13	3.5	3.7		9.1								10.0
14	-											
15	3.5					12.5						
16	1.8											
17	-											
18	-											
19	3.5											
20												
21												

Table 5. Percentage distribution of 2-sea-winter tag returns from Miramichi wild smolt tagging (1968-74) by week, by Nfld. Statistical Area. Each Area total percentage may vary slightly from 100% because of rounding.

WEEK	STATISTICAL AREA											
	A	B	C	D	E	F	G	H	I	J	K	O
1										6.1		
2			5.3		16.7	20		25		8.7		
3			15.8	50	16.7	40		25		17.9		
4		37.5	26.3	20	33.3	20		25		13.8		
5		37.5	15.8	20	33.3	-		-		24.1		
6	66.6	-	21.0	10		20		25		11.4		33.3
7	-	12.5	5.3							6.8	100	-
8	-	-	5.3						100	6.8		33.3
9	-	-								2.2		-
10	16.7	-								-		-
11	16.7	12.5								-		-
12										2.2		33.3
13												
14												
15												

Assumptions Made in Determining Number, Distribution and Timing of Miramichi Origin Salmon in the Newfoundland Commercial Salmon Fishery

(1) In order to arrive at an estimate of exploitation rates, timing of harvest, location of harvest, etc., wild smolt tagging studies carried out between 1968 and 1976 on the Miramichi were used. In most calculations, the data from the 1968 to 1973 taggings were used because returns were essentially complete.

(2) Tagged wild Miramichi smolt were assumed to behave in a similar manner to wild untagged smolt in relation to migration route, timing of migration, exploitation rate, natural mortality, etc.

(3) All recaptures of wild smolt in Newfoundland waters for which complete data was available were used, i.e., recapture date, location, method of capture and preferably with a scale sample.

(4) By averaging percent recapture of tagged Miramichi smolt in the Newfoundland fisheries between the years 1969 and 1975 we obtained an "average" year's distribution. Recaptures were allocated to Newfoundland statistical districts and then split up into week of recapture according to week "formula" decided on by committee.

The data used represents an "average" distribution and timing picture. It is recognized that these "averages" could be exceeded or not be reached in any particular year because of changing effort due to ice conditions, storms, etc.

(5) To determine the actual "average" catch of Miramichi salmon in Newfoundland waters, individual years' tagging data on a return/1000 tagged were analyzed. The 1970 data was not used because of the "overlap" with the ban's introduction. Because of the similarity between exploitation rates for Newfoundland fisheries obtained from the 1968 and 1969 data versus the 1971 to 1973 data, we used the latter as they could be compared directly with detailed commercial data available from Newfoundland. Escapement to spawn in the Miramichi was determined using 20% exploitation by "home-water" anglers.

(6) To determine actual numbers of Miramichi salmon harvested in Newfoundland fishery, it was assumed that percent angling exploitation of tagged fish in the Miramichi was related to total angling catch and that, when compared with the calculated percent commercial exploitation of tagged fish in Newfoundland, the untagged harvest in Newfoundland could be calculated. It was assumed that there was no natural mortality to home waters from Newfoundland and that no tag loss took place during this period. The total numbers of Miramichi fish harvested were then allocated to area and week of capture.

(7) Because of non-reporting and ice conditions (see Henry Lear's calculations), additional tags not reported or missed in Area "J" were added to tables at a later date.

(8) The numbers of Miramichi fish caught in Newfoundland by area by week were then converted to pounds of fish using 4.41 lb (1.98 kg)/fish for 1-s-w salmon and 9.92 lb (4.46 kg)/fish for 2-s-w salmon (according to average weights determined in Newfoundland fisheries).

(9) Assuming that Maritimes wished to see more of the harvested Miramichi fish escape Newfoundland, possible variations (options) to the present fishing regime were proposed. These options would provide for different escapement levels from Newfoundland depending on which one was imposed.

(10) In order to determine how various options affected Miramichi stocks in Newfoundland, it was necessary to determine exploitation rates from statistical area to statistical area (J. Ritter) and travel time along the coast and to home waters (H. Lear).

(11) Timing of recapture data from the east coast of Newfoundland demonstrated that approximately 60% of the one-sea-year salmon of Miramichi origin were not headed home as "grilse", but were destined to mature as 2-s-w salmon. It was also assumed that these salmon did not go to Greenland to be harvested before returning to Newfoundland waters the next year. They were, however, subject to a natural mortality (NM) of 19% before re-entering the Newfoundland fishery.

All 1-s-w salmon on the south coast of Newfoundland were headed "home" and all 2-s-w salmon of Miramichi origin in Newfoundland waters were headed home that same year.

(12) It had to be assumed that the 1-s-w salmon not heading home would return to the Newfoundland fishery the next year as 2-s-w salmon and some would be harvested. It was obvious that the exploitation rate would be altered because the "option" would now be in force.

Therefore, using the initial exploitation rate for all 2-s-w or potential 2-s-w Miramichi salmon in Newfoundland prior to the options introduction (38%), the exploitation rate for each option was calculated. The basis for this calculation was the "average" harvest of 2-s-w salmon prior to the ban compared to the new harvest with the option in force.

Option I B - 18%
II A - 9%
II B - 14%
III A - 14%
III B - 18%

(13) Assumed 20 miles/day travel by salmon.

(14) Most Maritimes Gulf stocks behaved as the Miramichi fish until we get up to Restigouche area.

(15) Angling data collected from rivers such as the Miramichi is comparable to data collected from the smaller Gulf rivers.

(16) Tag losses do not significantly alter the exploitation rates calculated.

APPENDIX XI.

Methodology to allocate estimates of Quebec origin salmon into areas and week of capture in the Nfld-Labrador fisheries

Tagging data from smolt released between 1968-1972 were used to allocate the estimated numbers of Quebec origin salmon in the Nfld fisheries into areas and weeks of capture. The proportions of tags returned from the different statistical areas were first calculated and then applied to the numbers of 1 SW, 2 SW, and 3 SW salmon estimates. Weight estimates were found by converting numbers to kilograms of salmon using the follow average weights: 2,04 kg for 1 SW, 4,48 kg for 2 SW and 7,69 kg for 3 SW salmon. (Tables 1,2,3,4).

The same tagging data base was also used to further refine the catch estimates of statiscal areas into weeks of capture. A standard week definition was first established and the proportions of tags returned from individual weeks has then been calculated for each statistical areas and for each age groups. These proportions were then applied to the catch estimates of each statistical areas then providing an estimate by age group of the numbers of salmon intercepted during the individual fishing weeks and in different statistical areas. Numbers were then converted to kilograms of salmon using the same average weights as above (table 5,6,7,8).

As a result of this allocation process of the catch estimates into statistical areas and week of captures, some discrepancies appeared between the catch estimates of mainland origin salmon and the total Newfoundland catch in some areas and in some week. Adjustments were then made to reconcile catch estimates and total catches. Results of this exercice appear in table 9 which was designed to replace data from table 8. This table also includes an adjusted estimate for area J which was not taken into account in tables 5,6,7 and 8.

Table I. Estimates of captures in Newfoundland of 1 SW Quebec origin salmon.

Area	Proportionate distribution	Number of fish	Weight of fish (kg)
O	9.7	469	957
A	19,3	933	1903
B	19,3	933	1903
C	12.9	624	1273
D	6,4	309	630
E	3,3	160	327
F	0,0	0	0
G	0.0	0	0
H	12,9	624	1273
I	0,0	0	0
J	12,9	624	1273
K	0,0	0	0
L	3,3	160	326
TOTAL:	100,0	4836	9865

Table 2. Estimates of captures in Newfounland
of 2 SW Quebec origin salmon.

Area	Proportionate distribution	Number of fish	Weight of fish (kg)
0	10,2	4226	18932
A	18,8	7790	34899
B	8,4	3480	15590
C	12,1	5013	22458
D	5,8	2403	10765
E	14,0	5801	25989
F	8,4	3480	15590
G	0,0	0	0
H	2,8	1160	5197
I	3,7	1533	6868
J	15,8	6547	29331
K	0,0	0	0
L	0,0	0	0
Total:	100,00	41 433	185 620

Table 3. Estimate of captures in Newfoundland of 3 SW Quebec origin salmon

Area	Proportionate distribution	Number of fish	Weight of fish (kg)
O	9,1	146	1123
A	9,1	146	1123
B	0,0	0	0
C	0,0	0	0
D	0,0	0	0
E	9,1	146	1123
F	18,2	293	2252
G	0,0	0	0
H	0,0	0	0
I	9,1	146	1123
J	45,4	730	5614
K	0,0	0	0
L	0,0	0	0
TOTAL:	100,00	1607	12358

Table 4. Estimates of captures in Newfoundland of Quebec origin salmon

Area	Number of	Weight of
O	4841	21012
A	8669	37925
B	4413	17493
C	5637	23731
D	2712	11395
E	6107	27439
F	3773	17842
G	0	0
H	1784	6470
I	1679	7991
J	7901	32218
K	0	0
L	160	326
TOTAL:	47876	207843

Table 5. Estimates of numbers (and pounds) of 1 SW Quebec origin salmon caught in the Newfoundland [illegible]

AREAS

Week	O	A	B	C	D	E	F	G	H	I	J	K	L	Total
1														0
2														0
3														0
4														0
5					155 (681)									155 (681)
6				156 (688)							156 (688)			312 (1376)
7			311 (1371)	312 (1376)					156 (688)					779 (3435)
8		156 (688)	311 (1371)	156 (688)					312 (1376)		312 (1376)			1 247 (5499)
9	157 (689)	465 (2057)	156 (688)						156 (688)		156 (688)			1 091 (4812)
10		156 (688)			154 (681)								160 (706)	470 (2073)
11		156 (688)												156 (688)
12	157 (689)													157 (689)
13														0
14														0
15														0
16														0
Other	155 (690)		155 (687)											310 (1377)
Total	469 (2068)	933 (4115)	933 (4115)	624 (2752)	309 (1362)	*	0	0	624 (2752)	0	624 (2752)	0	160 (706)	4 836 (20622)

* 160. Salmon caught in area E could not be allocated into any fishing week on account of lack of information.

Table 6. Estimates of numbers (and pounds) of 2 SW Quebec origin salmon caught in the Newfoundland fisheries

AREA

Week	O	A	B	C	D	E	F	G	H	I	J	K	L	Total
1						387 (3837)								387 (3837)
2						1160 (11509)	1160 (11506)							2 320 (23015)
3				386 (3825)		1160 (11509)	387 (3836)		387 (3836)		385 (3820)			2 705 (26826)
4			387 (3836)	1156 (11476)	401 (3973)	1160 (11509)				383 (3802)	1156 (11491)			4 643 (46087)
5			1160 (11506)	771 (7651)	1601 (15892)				773 (7671)	383 (3802)	2696 (26743)			7 384 (73265)
6		779 (7728)		386 (3825)		1160 (11509)	773 (7672)			383 (3802)	770 (7641)			4 251 (42177)
7	384 (3811)	779 (7728)		771 (7651)		774 (7673)	773 (7672)				770 (7641)			4 251 (42176)
8	384 (3811)	1160 (11591)		771 (7651)						384 (3801)	385 (3820)			3 091 (30674)
9		1947 (19319)		386 (3825)			387 (3836)							2 720 (26980)
10	768 (7623)	779 (7728)	773 (7672)	386 (3825)										2 706 (26848)
11	1153 (11433)	1169 (11591)	773 (7672)		401 (3973)									3 496 (34669)
12		779 (7728)									385 (3820)			1 164 (11548)
13														0
14														0
15	384 (3811)	389 (3864)												773 (7675)
Other	1153 (11433)		387 (3836)											1 540 (15269)
Total	4226 (41922)	7790 (77277)	3480 (34522)	5013 (49729)	2403 (23838)	5801 (57546)	3480 (34522)	0	1160 (11507)	1533 (15207)	6547 (64948)	0	0	(411046)

Table 7. Estimates of numbers (and pounds) of 3 SW Quebec origin salmon caught in the Newfoundland fisheries.

[illegible]

[illegible]	O	A	B	C	D	E	F	G	H	I	J	K	L	Total
1														0
2						146 (2413)								146 (2413)
3							146 (2421)				292 (4827)			438 (7248)
4										146 (2413)				146 (2413)
5							147 (2422)				292 (4827)			439 (7249)
6											146 (2413)			146 (2413)
7														0
8		146 (2413)												146 (2413)
9														0
10	146 (2413)													146 (2413)
11														0
12														0
13														0
14														0
15														0
Other														
Total	146 (2413)	146 (2413)	0	0	0	146 (2413)	293 (4843)	0	0	146 (2413)	730 (12067)	0	0	1607 (26562)

Table 8. Estimate of numbers (and pounds) of Quebec origin salmon caught in the Newfoundland fisheries.

							AREA							
Week	O	A	B	C	D	E	F	G	H	I	J	K	L	Total
1						387 (3837)								387 (3837)
2						1306 (13922)	1160 (11506)							2466 (25428)
3				386 (3825)		1160 (11509)	533 (6257)		387 (3836)		677 (9647)			3143 (35074)
4			387 (3836)	1156 (11476)	401 (3973)	1160 (11509)				539 (6215)	1156 (11461)			4799 (48470)
5			1160 (11506)	771 (7651)	1756 (16573)		147 (2422)		773 (7671)	383 (3802)	2988 (31570)			7978 (81195)
6		779 (7728)		542 (4513)		1160 (11509)	773 (7672)			383 (3802)	1042 (10742)			4709 (45967)
7	384 (3811)	779 (7728)	311 (1371)	1083 (9027)		774 (7673)	773 (7672)		156 (688)		770 (7641)			5030 (45611)
8	384 (3811)	1471 (14690)	311 (1371)	927 (8339)					312 (1376)	384 (3801)	697 (5196)			4486 (38584)
9	157 (689)	2412 (21376)	156 (686)	386 (3825)			387 (3836)		156 (688)		156 (688)			3810 (31735)
10	914 (10036)	935 (8414)	773 (7672)	386 (3825)	154 (681)								160 (706)	3322 (31334)
11	1153 (11433)	1325 (12277)	773 (7672)		401 (3973)									3652 (35355)
12	157 (689)	779 (7728)									385 (3820)			1321 (12237)
13														0
14														0
15	384 (3811)	389 (3864)												773 (7675)
Other	1308 (12123)		542 (4523)			160 (706)								2010 (17352)
Total	4841 (46403)	8869 (83805)	4413 (38637)	5637 (52481)	3712 (25200)	6107 (60665)	3773 (39365)	0	1784 (14259)	1679 (17620)	7901 (79763)	0	160 (706)	47876 (458904)

Table 9. Adjusted estimates of pounds of Quebec origin salmon caught in the Newfoundland fisheries.

							AREAS							
Week	O	A	B	C	D	E	F	G	H	I	J	K	L	Total
1						3837					7992			11632
2						13922	11506				11273			36701
3				3825		11509	6257		3838		23186			48615
4			3836	11476	3973	11509				6215	28043			65052
5			11506	7651	16573	706	2422		7671	3802	39034			89363
6		7728		4513		11509	7672			3802	8329			43553
7	3811	7728	1371	9027		7673	7672		686		10054			48024
8	3811	14690	1371	8339					1376	3801	5196			38584
9	689	21376	686	3825			3836		686		688			31788
10	10036	8414	7672	3825	681								706	31334
11	11433	12277	7672		3973									35355
12	689	7728									3820			12237
13														
14														7673
15	3811	3864												7675
Other	12123		4523											16646
Total	46403	83805	38637	52481	25200	60665	39365	0	14259	17620	137615	0	706	316759

APPENDIX XII

Determination of Swimming Speed

Swimming speeds at sea of Atlantic salmon were determined from fish which were tagged and released in the Newfoundland-Labrador coastal areas during 1969-75 and subsequently recaptured. The number of days free were defined as the number of days from the day the fish was tagged until it was recaptured. Only fish that had been free for more than one day and had travelled more than five miles were included in the calculations. The mileages were obtained from nautical charts and were the shortest straight line distance or were the total distance from point to point along the coast from the place of tagging and release to the place of recapture. The mean rates of travel were calculated as nautical miles day^{-1} for each of the sea-age classes 1-, 2-, and 3-sea-winter and previously spawned salmon.

The mileages between areas were calculated as the shortest straight line distance or point-to-point distance along the coast from the mid-point of one Area to the mid-point of the Area of destination based on migration patterns determined from tagging experiments.

The rates of travel of 1-, 2-, and 3-sea-winter salmon were very similar with arithmetic means ranging from 10.3 to 11.3 miles day^{-1} and geometric means ranging from 8.8 to 9.2 miles day^{-1}. Since these sea-age classes constitute about 98% of the commercial catch, it was deemed reasonable to consider a rate of travel of 10 miles day^{-1} as a minimal one.

Calculations of swimming speed required certain assumptions:

(1) The fish was caught immediately as it entered the recapture area.

(2) The fish travels in straight lines by the most direct route.

(3) All fish exhibit the migration patterns obtained from tagging experiments, which ignores stock differences.

These assumptions all contributed to the calculation of a lowered daily rate of movement. The Working Group felt the assumptions were seldom met in their entirety. Moreover, some fish in these studies and in other past studies exceeded the 20 miles/day rate.

Rates of movement of unhindered salmon probably follow a normal distribution. Effects of tagging can only move the mode to the left, i.e., to decrease the average rate, because of handling stress, possible effects of tag on performance and, most importantly, delay in recapture in mainland areas because a considerable portion was recaptured by angling in the absence of a commercial fishery.

On the assumption that mainland multi-sea-winter fish captured on the east coast of Newfoundland are the same "lot" as those on the south coast, the 20 mi/day rate fits the east and south coast peak catches better. That is, fish uncaught on the east coast peak will move through the south coast area behind the peak there unless a rate of movement faster than 10 mi/day is used.

Thus, the rate of 20 miles/day was chosen as the best estimate of the average rate of migrating speed.

The number of days required for Atlantic salmon to travel from one area to another in Newfoundland and Labrador and to other areas in eastern Canada were then calculated on the basis of the mileage between areas, assuming a rate of travel of 20 miles day^{-1}.

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APPENDIX XIII.

Summation* of estimated losses to Newfoundland Commercial Fisheries and gains to Maritime Fisheries resulting from the imposition of each of seven regulatory options considered.

OPTION	STOCK	AFFECTED		LOSSES TO NFLD.		GAINS TO MARITIMES	
		NO.	POUNDS	NO.	POUNDS	NO.	POUNDS
1A	Restigouche	19,885	159,989	19,885	159,989	17,197	200,466
	Minor Gulf	5,190	44,433	5,190	44,433	4,955	46,809
	Saint John	1,336	5,892	1,336	5,892	1,190	8,543
	Nova Scotia	2,949	14,471	2,949	14,471	2,706	18,661
	Miramichi	30,171	196.953	30,171	196.953	27,927	224.762
1B	Restigouche	11,220	91,119	10,303	82,964	8,966	103,277
	Minor Gulf	3,043	26,360	2,727	23,660	2,630	24,490
	Saint John	364	1,605	352	1,552	348	1,535
	Nova Scotia	1,735	9,117	1,614	8,357	1,563	8,849
	Miramichi	14,613	101.162	12,761	87.825	11,856	101.042
2A	Restigouche	8,622	84,713	8,107	80,111	7,867	82,182
	Minor Gulf	3,084	29,158	2,929	27,785	2,866	27,323
	Saint John	379	1,671	359	1,583	348	1,716
	Nova Scotia	1,566	8,372	1,501	8,085	1,486	8,002
	Miramichi	12,836	108.572	11,954	101.618	11,556	105,506
2B	Restigouche	7,183	69,955	6,668	65,365	6,475	67,378
	Minor Gulf	2,786	25,347	2,591	23,627	2,521	23,978
	Saint John	405	1,786	393	1,733	381	1,862
	Nova Scotia	1,566	8,372	1,466	7,711	1,452	7,637
	Miramichi	11,354	92.134	10,378	84.462	9,994	88.572
3A	Restigouche	6,310	63,718	5,793	58,657	5,735	58,067
	Minor Gulf	2,363	22,948	2,229	21,668	2,197	21,607
	Saint John	242	1,067	219	966	217	957
	Nova Scotia	1,066	6,167	1,001	5,880	991	5,819
	Miramichi	8,980	82,006	8,469	77,433	8,298	78.063
3B	Restigouche	5,173	51,833	4,700	47,268	4,653	46,793
	Minor Gulf	2,019	19,419	1,963	18,874	1,931	18,830
	Saint John	379	1,671	360	1,588	349	1,721
	Nova Scotia	1,166	6,608	1,081	6,013	1,070	5,953
	Miramichi	8,471	73,476	7,916	68.637	7,747	69.330
QUEBEC	Restigouche	6,222	61,788	5,690	56,462	5,548	56,353
	Minor Gulf	2,100	20,091	1,905	18,271	1,860	18,427
	Saint John	182	803	163	719	161	710
	Nova Scotia	666	4,403	628	4,235	621	4,199
	Miramichi	10,553	88.927	9,588	80.925	9,219	84.659

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*Details follow in Tables 1-5.

TABLE 1a. Impact of introduction of Option 1A to the Newfoundland commercial salmon fishery on Restigouche origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	7268	32052
	Harvested later in same year	0	0
	Net loss end of 1st year	7268	32052
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	7268	32052
Home	Homing as 1-sea-winter salmon	1263	5570
	Homing as 2-sea-winter salmon	3138	31129
	Homing as 3-sea-winter salmon	1236	20431
	Total gain to home waters	5637	57130

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	12197	120994
	Harvested later in same year	0	0
	Net loss end of 1st year	12197	120994
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	12197	120994
Home	Homing as 2-sea-winter salmon	7224	71662
	Homing as 3-sea-winter salmon	3920	64798
	Total gain to home waters	11144	136460

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	420	6943
	Harvested later in same year	0	0
	Total net decreased catch	420	6943
Home	Homing as 3-sea-winter salmon	416	6876
	Total gain to home waters	416	6876

TABLE 1b. Impact of introduction of Option 1B to the Newfoundland commercial salmon fishery on Restigouche origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	3999	17636
	Harvested later in same year	261	1151
	Net loss end of 1st year	3738	16485
	Harvested as 2-sea-winter salmon	352	3492
	Harvested as 3-sea-winter salmon	18	298
	Total net decreased catch	3368	12695
Home	Homing as 1-sea-winter salmon	544	2399
	Homing as 2-sea-winter salmon	1484	14721
	Homing as 3-sea-winter salmon	515	8513
	Total gain to home waters	2543	25633

2-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	6941	68855
	Harvested later in same year	229	2272
	Net loss end of 1st year	6712	66583
	Harvested as 3-sea-winter salmon	57	942
	Total net decreased catch	6655	65641
Home	Homing as 2-sea-winter salmon	4316	42815
	Homing as 3-sea-winter salmon	1830	30250
	Total gain to home waters	6146	73065

3-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	280	4628
	Harvested later in same year	0	0
	Total net decreased catch	280	4628
Home	Homing as 3-sea-winter salmon	277	4579
	Total gain to home waters	277	4579

TABLE 1c. Impact of introduction of Option 2A to the Newfoundland commercial salmon fishery on Restigouche origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	484	2134
	Harvested later in same year	116	512
	Net loss end of 1st year	368	1622
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	368	1622
Home	Homing as 1-sea-winter salmon	364	1605
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	364	1605

2-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	7858	77951
	Harvested later in same year	379	3760
	Net loss end of 1st year	7479	74192
	Harvested as 3-sea-winter salmon	20	331
	Total net decreased catch	7459	73861
Home	Homing as 2-sea-winter salmon	6573	65204
	Homing as 3-sea-winter salmon	653	10794
	Total gain to home waters	7226	75998

3-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	280	4628
	Harvested later in same year	0	0
	Total net decreased catch	280	4628
Home	Homing as 3-sea-winter salmon	277	4579
	Total gain to home waters	277	4579

TABLE 1d. Impact of introduction of Option 2B to the Newfoundland commercial salmon fishery on Restigouche origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	572	2523
	Harvested later in same year	113	498
	Net loss end of 1st year	459	2024
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	459	2024
Home	Homing as 1-sea-winter salmon	454	2002
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	454	2002

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	6331	62804
	Harvested later in same year	379	3760
	Net loss end of 1st year	5952	59044
	Harvested as 3-sea-winter salmon	20	331
	Total net decreased catch	5932	58713
Home	Homing as 2-sea-winter salmon	5091	50503
	Homing as 3-sea-winter salmon	653	10794
	Total gain to home waters	5744	61297

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	280	4628
	Harvested later in same year	0	0
	Total net decreased catch	280	4628
Home	Homing as 3-sea-winter salmon	277	4579
	Total gain to home waters	277	4579

TABLE 1e. Impact of introduction of Option 3A to the Newfoundland commercial salmon fishery on Restigouche origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	132	582
	Harvested later in same year	29	128
	Net loss end of 1st year	103	454
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	103	454
Home	Homing as 1-sea-winter salmon	102	450
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	102	450

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	5898	58508
	Harvested later in same year	474	4702
	Net loss end of 1st year	5424	53806
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	5424	53806
Home	Homing as 2-sea-winter salmon	5370	53270
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	5370	53270

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	280	4628
	Harvested later in same year	14	231
	Total net decreased catch	266	4397
Home	Homing as 3-sea-winter salmon	263	4347
	Total gain to home waters	263	4347

TABLE 1f. Impact of introduction of Option 3B to the Newfoundland commercial salmon fishery on Restigouche origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	242	1067
	Harvested later in same year	23	101
	Net loss end of 1st year	219	966
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	219	966
Home	Homing as 1-sea-winter salmon	217	957
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	217	957

2-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	4651	46138
	Harvested later in same year	450	4464
	Net loss end of 1st year	4201	41674
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	4201	41674
Home	Homing as 2-sea-winter salmon	4159	41257
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	4159	41257

3-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	280	4628
	Harvested later in same year	0	0
	Total net decreased catch	280	4628
Home	Homing as 3-sea-winter salmon	277	4579
	Total gain to home waters	277	4579

TABLE 19. Impact of introduction of Option Quebec to the Newfoundland commercial salmon fishery on Restigouche origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON

Impact		Numbers	Pounds
Newfoundland	Affected	324	1429
	Harvested later in same year	19	84
	Net loss end of 1st year	305	1345
	Harvested as 2-sea-winter salmon	30	298
	Harvested as 3-sea-winter salmon	2	33
	Total net decreased catch	273	1014
Home	Homing as 1-sea-winter salmon	90	397
	Homing as 2-sea-winter salmon	78	774
	Homing as 3-sea-winter salmon	18	298
	Total gain to home waters	186	1469

2-SEA-WINTER SALMON

Impact		Numbers	Pounds
Newfoundland	Affected	5618	55731
	Harvested later in same year	460	4563
	Net loss end of 1st year	5158	51167
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	5158	51167
Home	Homing as 2-sea-winter salmon	5106	50652
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	5106	50652

3-SEA-WINTER SALMON

Impact		Numbers	Pounds
Newfoundland	Affected	280	4628
	Harvested later in same year	21	347
	Total net decreased catch	259	4281
Home	Homing as 3-sea-winter salmon	256	4232
	Total gain to home waters	256	4232

TABLE 2a. Impact of introduction of Option 1A to the Newfoundland commercial salmon fishery on Minor Gulf Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON

Impact		Numbers	Pounds
Newfoundland	Affected	1359	5993
	Harvested later in same year	0	0
	Net loss end of 1st year	1359	5993
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	1359	5993
Home	Homing as 1-sea-winter salmon	706	3113
	Homing as 2-sea-winter salmon	462	4583
	Homing as 3-sea-winter salmon	27	446
	Total gain to home waters	1195	8142

2-SEA-WINTER SALMON

Impact		Numbers	Pounds
Newfoundland	Affected	3765	37349
	Harvested later in same year	0	0
	Net loss end of 1st year	3765	37349
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	3765	37349
Home	Homing as 2-sea-winter salmon	3553	35246
	Homing as 3-sea-winter salmon	142	2347
	Total gain to home waters	3695	37593

3-SEA-WINTER SALMON

Impact		Numbers	Pounds
Newfoundland	Affected	66	1091
	Harvested later in same year	0	0
	Total net decreased catch	66	1091
Home	Homing as 3-sea-winter salmon	65	1074
	Total gain to home waters	65	1074

TABLE 2b. Impact of introduction of Option 1B to the Newfoundland commercial salmon fishery on Minor Gulf Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	721	3180
	Harvested later in same year	85	375
	Net loss end of 1st year	636	2805
	Harvested as 2-sea-winter salmon	12	119
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	624	2686
Home	Homing as 1-sea-winter salmon	325	1433
	Homing as 2-sea-winter salmon	211	2093
	Homing as 3-sea-winter salmon	12	198
	Total gain to home waters	548	3724

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	2300	22816
	Harvested later in same year	214	2123
	Net loss end of 1st year	2086	20693
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	2086	20693
Home	Homing as 2-sea-winter salmon	2065	20485
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	2065	20485

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	22	364
	Harvested later in same year	5	83
	Total net decreased catch	17	281
Home	Homing as 3-sea-winter salmon	17	281
	Total gain to home waters	17	281

TABLE 2_c. Impact of introduction of Option 2A to the Newfoundland commercial salmon fishery on Minor Gulf Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	287	1266
	Harvested later in same year	30	132
	Net loss end of 1st year	257	1133
	Harvested as 2-sea-winter salmon	3	30
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	254	1103
Home	Homing as 1-sea-winter salmon	144	635
	Homing as 2-sea-winter salmon	68	675
	Homing as 3-sea-winter salmon	6	99
	Total gain to home waters	218	1409

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	2775	27528
	Harvested later in same year	122	1210
	Net loss end of 1st year	2653	26318
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	2653	26318
Home	Homing as 2-sea-winter salmon	2626	26050
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	2626	26050

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	22	364
	Harvested later in same year	0	0
	Total net decreased catch	22	364
Home	Homing as 3-sea-winter salmon	22	364
	Total gain to home waters	22	364

TABLE 2d. Impact of introduction of Option 2B to the Newfoundland commercial salmon fishery on Minor Gulf Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	442	1949
	Harvested later in same year	40	176
	Net loss end of 1st year	402	1773
	Harvested as 2-sea-winter salmon	7	69
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	395	1704
Home	Homing as 1-sea-winter salmon	223	983
	Homing as 2-sea-winter salmon	115	1141
	Homing as 3-sea-winter salmon	9	149
	Total gain to home waters	347	2273

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	2322	23034
	Harvested later in same year	147	1458
	Net loss end of 1st year	2175	21576
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	2175	21576
Home	Homing as 2-sea-winter salmon	2153	21358
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	2153	21358

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	22	364
	Harvested later in same year	1	17
	Total net decreased catch	21	347
Home	Homing as 3-sea-winter salmon	21	347
	Total gain to home waters	21	347

TABLE 2e. Impact of introduction of Option 3A to the Newfoundland commercial salmon fishery on Minor Gulf Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	116	512
	Harvested later in same year	9	40
	Net loss end of 1st year	107	472
	Harvested as 2-sea-winter salmon	2	20
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	105	452
Home	Homing as 1-sea-winter salmon	63	278
	Homing as 2-sea-winter salmon	29	288
	Homing as 3-sea-winter salmon	2	33
	Total gain to home waters	94	599

2-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	2225	22072
	Harvested later in same year	123	1220
	Net loss end of 1st year	2102	20852
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	2102	20852
Home	Homing as 2-sea-winter salmon	2081	20644
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	2081	20644

3-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	22	364
	Harvested later in same year	0	0
	Total net decreased catch	22	364
Home	Homing as 3-sea-winter salmon	22	364
	Total gain to home waters	22	364

TABLE 2f. Impact of introduction of Option 3B to the Newfoundland commercial salmon fishery on Minor Gulf Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON

Impact		Numbers	Pounds
Newfoundland	Affected	137	604
	Harvested later in same year	8	35
	Net loss end of 1st year	129	569
	Harvested as 2-sea-winter salmon	3	30
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	126	539
Home	Homing as 1-sea-winter salmon	82	362
	Homing as 2-sea-winter salmon	28	278
	Homing as 3-sea-winter salmon	2	33
	Total gain to home waters	112	673

2-SEA-WINTER SALMON

Impact		Numbers	Pounds
Newfoundland	Affected	1860	18451
	Harvested later in same year	40	397
	Net loss end of 1st year	1820	18054
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	1820	18054
Home	Homing as 2-sea-winter salmon	1802	17876
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	1802	17876

3-SEA-WINTER SALMON

Impact		Numbers	Pounds
Newfoundland	Affected	22	364
	Harvested later in same year	5	83
	Total net decreased catch	17	281
Home	Homing as 3-sea-winter salmon	17	281
	Total gain to home waters	17	281

TABLE 2g. Impact of introduction of Option Quebec to the Newfoundland commercial salmon fishery on Minor Gulf Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	161	710
	Harvested later in same year	21	93
	Net loss end of 1st year	140	617
	Harvested as 2-sea-winter salmon	4	40
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	136	577
Home	Homing as 1-sea-winter salmon	37	163
	Homing as 2-sea-winter salmon	66	655
	Homing as 3-sea-winter salmon	5	83
	Total gain to home waters	108	901

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	1917	19017
	Harvested later in same year	170	1686
	Net loss end of 1st year	1747	17330
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	1747	17330
Home	Homing as 2-sea-winter salmon	1730	17162
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	1730	17162

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	22	364
	Harvested later in same year	0	0
	Total net decreased catch	22	364
Home	Homing as 3-sea-winter salmon	22	364
	Total gain to home waters	22	364

TABLE 3a. Impact of introduction of Option 1A to the Newfoundland commercial salmon fishery on Saint John River origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	1336	5892
	Harvested later in same year	0	0
	Net loss end of 1st year	1336	5892
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	1336	5892
Home	Homing as 1-sea-winter salmon	592	2611
	Homing as 2-sea-winter salmon	598	5932
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	1190	8543

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Net loss end of 1st year		
	Harvested as 3-sea-winter salmon		
	Total net decreased catch		
Home	Homing as 2-sea-winter salmon		
	Homing as 3-sea-winter salmon		
	Total gain to home waters		

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 3b. Impact of introduction of Option 1B to the Newfoundland commercial salmon fishery on Saint John River origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	364	1605
	Harvested later in same year	12	53
	Net loss end of 1st year	352	1552
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	352	1552
Home	Homing as 1-sea-winter salmon	348	1535
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	348	1535

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Net loss end of 1st year		
	Harvested as 3-sea-winter salmon		
	Total net decreased catch		
Home	Homing as 2-sea-winter salmon		
	Homing as 3-sea-winter salmon		
	Total gain to home waters		

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 3c. Impact of introduction of Option 2A to the Newfoundland commercial salmon fishery on Saint John River origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	379	1671
	Harvested later in same year	20	88
	Net loss end of 1st year	359	1583
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	359	1583
Home	Homing as 1-sea-winter salmon	315	1389
	Homing as 2-sea-winter salmon	33	327
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	348	1716

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Net loss end of 1st year		
	Harvested as 3-sea-winter salmon		
	Total net decreased catch		
Home	Homing as 2-sea-winter salmon		
	Homing as 3-sea-winter salmon		
	Total gain to home waters		

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 3d. Impact of introduction of Option 2B to the Newfoundland commercial salmon fishery on Saint John River origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	405	1786
	Harvested later in same year	12	53
	Net loss end of 1st year	393	1733
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	393	1733
Home	Homing as 1-sea-winter salmon	348	1535
	Homing as 2-sea-winter salmon	33	327
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	381	1862

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Net loss end of 1st year		
	Harvested as 3-sea-winter salmon		
	Total net decreased catch		
Home	Homing as 2-sea-winter salmon		
	Homing as 3-sea-winter salmon		
	Total gain to home waters		

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 3e. Impact of introduction of Option 3A to the Newfoundland commercial salmon fishery on Saint John River origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	242	1067
	Harvested later in same year	23	101
	Net loss end of 1st year	219	966
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	219	966
Home	Homing as 1-sea-winter salmon	217	957
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	217	957

2-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Net loss end of 1st year		
	Harvested as 3-sea-winter salmon		
	Total net decreased catch		
Home	Homing as 2-sea-winter salmon		
	Homing as 3-sea-winter salmon		
	Total gain to home waters		

3-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 3f. Impact of introduction of Option 3B to the Newfoundland commercial salmon fishery on Saint John River origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	379	1671
	Harvested later in same year	19	84
	Net loss end of 1st year	360	1588
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	360	1588
Home	Homing as 1-sea-winter salmon	316	1394
	Homing as 2-sea-winter salmon	33	327
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	349	1721

2-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Net loss end of 1st year		
	Harvested as 3-sea-winter salmon		
	Total net decreased catch		
Home	Homing as 2-sea-winter salmon		
	Homing as 3-sea-winter salmon		
	Total gain to home waters		

3-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 59. Impact of introduction of Option Quebec to the Newfoundland commercial salmon fishery on Saint John River origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	182	803
	Harvested later in same year	19	84
	Net loss end of 1st year	163	719
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	163	719
Home	Homing as 1-sea-winter salmon	161	710
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	161	710

2-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Net loss end of 1st year		
	Harvested as 3-sea-winter salmon		
	Total net decreased catch		
Home	Homing as 2-sea-winter salmon		
	Homing as 3-sea-winter salmon		
	Total gain to home waters		

3-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 4 a. Impact of introduction of Option 1A to the Newfoundland commercial salmon fishery on Atlantic Coast Nova Scotia Rivers origin Atlantic salmon in that fishery.

	1-SEA-WINTER SALMON		
	Impact	Numbers	Pounds
Newfoundland	Affected	2683	11832
	Harvested later in same year	0	0
	Net loss end of 1st year	2683	11832
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	2683	11832
Home	Homing as 1-sea-winter salmon	1485	6549
	Homing as 2-sea-winter salmon	958	9503
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	2443	16052

	2-SEA-WINTER SALMON		
	Impact	Numbers	Pounds
Newfoundland	Affected	266	2639
	Harvested later in same year	0	0
	Net loss end of 1st year	266	2639
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	266	2639
Home	Homing as 2-sea-winter salmon	263	2609
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	263	2609

	3-SEA-WINTER SALMON		
	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 4b. Impact of introduction of Option 1B to the Newfoundland commercial salmon fishery on Atlantic Coast Nova Scotia Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	1469	6478
	Harvested later in same year	80	353
	Net loss end of 1st year	1389	6125
	Harvested as 2-sea-winter salmon	1	10
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	1388	6115
Home	Homing as 1-sea-winter salmon	1208	5327
	Homing as 2-sea-winter salmon	131	1300
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	1339	6627

2-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	266	2639
	Harvested later in same year	40	397
	Net loss end of 1st year	226	2242
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	226	2242
Home	Homing as 2-sea-winter salmon	224	2222
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	224	2222

3-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 4c. Impact of introduction of Option 2A to the Newfoundland commercial salmon fishery on Atlantic Coast Nova Scotia Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	1300	5733
	Harvested later in same year	65	287
	Net loss end of 1st year	1235	5446
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	1235	5446
Home	Homing as 1-sea-winter salmon	1223	5393
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	1223	5393

2-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	266	2639
	Harvested later in same year	0	0
	Net loss end of 1st year	266	2639
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	266	2639
Home	Homing as 2-sea-winter salmon	263	2609
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	263	2609

3-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 4d. Impact of introduction of Option 2B to the Newfoundland commercial salmon fishery on Atlantic Coast Nova Scotia Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	1300	5733
	Harvested later in same year	60	265
	Net loss end of 1st year	1240	5468
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	1240	5468
Home	Homing as 1-sea-winter salmon	1228	5415
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	1228	5415

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	266	2639
	Harvested later in same year	40	397
	Net loss end of 1st year	226	2242
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	226	2242
Home	Homing as 2-sea-winter salmon	224	2222
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	224	2222

3-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 4e. Impact of introduction of Option 3A to the Newfoundland commercial salmon fishery on Atlantic Coast Nova Scotia Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	800	3528
	Harvested later in same year	65	287
	Net loss end of 1st year	735	3241
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	735	3241
Home	Homing as 1-sea-winter salmon	728	3210
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	728	3210

2-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	266	2639
	Harvested later in same year	0	0
	Net loss end of 1st year	266	2639
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	266	2639
Home	Homing as 2-sea-winter salmon	263	2609
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	263	2609

3-SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 4f. Impact of introduction of Option 3B to the Newfoundland commercial salmon fishery on Atlantic Coast Nova Scotia Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	900	3969
	Harvested later in same year	45	198
	Net loss end of 1st year	855	3771
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	855	3771
Home	Homing as 1-sea-winter salmon	846	3731
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	846	3731

2-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	266	2639
	Harvested later in same year	40	397
	Net loss end of 1st year	226	2242
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	226	2242
Home	Homing as 2-sea-winter salmon	224	2222
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	224	2222

3-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

TABLE 4g. Impact of introduction of Option Quebec to the Newfoundland commercial salmon fishery on Atlantic Coast Nova Scotia Rivers origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	400	1764
	Harvested later in same year	38	168
	Net loss end of 1st year	362	1596
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	362	1596
Home	Homing as 1-sea-winter salmon	358	1579
	Homing as 2-sea-winter salmon	0	0
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	358	1579

2-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	266	2639
	Harvested later in same year	0	0
	Net loss end of 1st year	266	2639
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	266	2639
Home	Homing as 2-sea-winter salmon	263	2609
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	263	2609

3-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected		
	Harvested later in same year		
	Total net decreased catch		
Home	Homing as 3-sea-winter salmon		
	Total gain to home waters		

Table 5a. Impact of introduction of Option 1A to the Newfoundland commercial salmon fishery on Miramichi origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	18,574	81,911
	Harvested later in same year	0	0
	Net loss end of 1st year	18,574	81,911
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	18,574	81,911
Home	Homing as 1-sea-winter salmon	9,487	41,838
	Homing as 2-sea-winter salmon	7,075	70,184
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	16,562	112,022

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	11,597	115,042
	Harvested later in same year	0	0
	Net loss end of 1st year	11,597	115,042
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	11,597	115,042
Home	Homing as 2-sea-winter salmon	11,365	112,740
	Homing as 3-sea-winter salmon	0	0
	Total gain to home waters	11,365	112,740

Table 5b. Impact of introduction of Option 1B to the Newfoundland commercial salmon fishery on Miramichi origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	7949	35055
	Harvested later in same year	914	4031
	Net loss end of 1st year	7035	31024
	Harvested as 2-sea-winter salmon	581	5764
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	6454	25260
Home	Homing as 1-sea-winter salmon	3007	13261
	Homing as 2-sea-winter salmon	2608	25871
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	5615	39132

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	6664	66107
	Harvested later in same year	357	3541
	Net loss end of 1st year	6307	62565
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	6307	62565
Home	Homing as 2-sea-winter salmon	6241	61910
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	6241	61910

Table 5c. Impact of introduction of Option 2A to the Newfoundland commercial salmon fishery on Miramichi origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	3405	15016
	Harvested later in same year	326	1438
	Net loss end of 1st year	3079	13578
	Harvested as 2-sea-winter salmon	104	1032
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	2975	12546
Home	Homing as 1-sea-winter salmon	1647	7263
	Homing as 2-sea-winter salmon	1021	10128
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	2668	17391

2-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	9431	93556
	Harvested later in same year	452	4484
	Net loss end of 1st year	8979	89072
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	8979	89072
Home	Homing as 2-sea-winter salmon	8888	88169
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	8888	88169

Table 5d. Impact of introduction of Option 2B to the Newfoundland commercial salmon fishery on Miramichi origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	3720	16405
	Harvested later in same year	365	1610
	Net loss end of 1st year	3355	14795
	Harvested as 2-sea-winter salmon	164	1627
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	3191	13168
Home	Homing as 1-sea-winter salmon	1918	8458
	Homing as 2-sea-winter salmon	963	9553
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	2881	18011

2-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	7634	75729
	Harvested later in same year	447	4434
	Net loss end of 1st year	7137	71295
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	7187	71295
Home	Homing as 2-sea-winter salmon	7113	70561
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	7113	70561

Table 3e. Impact of introduction of Option 3A to the Newfoundland commercial salmon fishery on Miramichi origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	1284	5662
	Harvested later in same year	90	397
	Net loss end of 1st year	1194	5265
	Harvested as 2-sea-winter salmon	47	466
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	1147	4799
Home	Homing as 1-sea-winter salmon	772	3405
	Homing as 2-sea-winter salmon	280	2778
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	1052	6183

2-SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	7696	76344
	Harvested later in same year	374	3710
	Net loss end of 1st year	7322	72634
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	7322	72634
Home	Homing as 2-sea-winter salmon	7246	71880
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	7246	71880

Table 5f. Impact of introduction of Option 3B to the Newfoundland commercial salmon fishery on Miramichi origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	1916	8450
	Harvested later in same year	121	534
	Net loss end of 1st year	1795	7916
	Harvested as 2-sea-winter salmon	61	605
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	1734	7311
Home	Homing as 1-sea-winter salmon	1365	6020
	Homing as 2-sea-winter salmon	266	2639
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	1631	8659

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	6555	65026
	Harvested later in same year	373	3700
	Net loss end of 1st year	6182	61326
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	6182	61326
Home	Homing as 2-sea-winter salmon	6116	60671
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	6116	60671

Table 5q. Impact of introduction of Option Que to the Newfoundland commercial salmon fishery on Miramichi origin Atlantic salmon in that fishery.

1-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	2861	12617
	Harvested later in same year	268	1182
	Net loss end of 1st year	2593	11435
	Harvested as 2-sea-winter salmon	201	1994
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	2392	9441
Home	Homing as 1-sea-winter salmon	1233	5438
	Homing as 2-sea-winter salmon	870	8630
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	2103	14068

2-SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	7692	76305
	Harvested later in same year	496	4921
	Net loss end of 1st year	7196	71384
	Harvested as 3-sea-winter salmon	-	-
	Total net decreased catch	7196	71384
Home	Homing as 2-sea-winter salmon	7116	70591
	Homing as 3-sea-winter salmon	-	-
	Total gain to home waters	7116	70591

APPENDIX XIV

Table 1. Summation of estimated losses to Newfoudnland Commercial Fisheries and gains to Quebec Fisheries resulting from the imposition of each of seven regulatory options considered

Option	Affected		Losses to Nfld		Gains to Quebec	
	No	Pounds	No	Pounds	No	Pounds
1A	54 784	527 434	54 784	527 434	45 682	533 031
1B	29 262	285 212	26 993	261 701	23 476	268 156
2A	31 725	319 358	30 537	307 133	28 859	306 993
2B	23 897	238 742	22 017	218 957	20 569	220 171
3A	26 952	272 524	25 456	257 022	24 233	256 702
3B	20 579	206 720	18 867	188 796	17 745	189 524
Québec	28 576	285 660	26 961	268 004	24 887	270 767

Table 2. Impact of introduction of Option 1A to the Newfoundland commercial salmon fishery on Quebec origin Atlantic salmon in that fishery

1 SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	4 836	21 327
	Harvested later in same year	0	0
	Net loss end of 1st year	4 836	21 327
	Harvested as 2-sea-winter salmon	0	0
	Harvested as 3-sea-winter salmon	0	0
	Total net decreased catch	4 836	21 327
Home	Homing as 1 sea-winter salmon	2 382	10 505
	Homing as 2 sea-winter salmon	1 139	11 299
	Homing as 3 sea-winter salmon	500	8 265
	Total gain to home waters	4 021	30 069

2 SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	48 341	479 543
	Harvested later in same year	0	0
	Net loss end of 1st year	48 341	479 543
	Harvested as 3 sea-winter salmon	0	0
	Total net decreased catch	48 341	479 543
Home	Homing as 2 sea-winter salmon	28 093	278 683
	Homing as 3 sea-winter salmon	12 334	203 881
	Total gain to home waters	40 427	482 564

3 SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	1 607	26 564
	Harvested later in same year	0	0
	Total net decreased catch	1 607	26 564
Home	Homing as 3 sea-winter salmon	1 234	20 398
	Total gain to home waters	1 234	20 398

Table 3. Impact of introduction of Option 1B to the Newfoundland commercial salmon fishery on Quebec origin Atlantic salmon in that fishery

1 SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	2 389	10 535
	Harvested later in same year	215	948
	Net loss end of 1st year	2 174	9 587
	Harvested as 2-sea-winter salmon	243	2 411
	Harvested as 3-sea-winter salmon	17	281
	Total net decreased catch	1 914	6 895
Home	Homing as 1 sea-winter salmon	545	2 403
	Homing as 2 sea-winter salmon	646	6 408
	Homing as 3 sea-winter salmon	268	4 430
	Total gain to home waters	1 459	13 241

2 SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	25 648	254 428
	Harvested later in same year	1 480	14 682
	Net loss end of 1st year	24 168	239 747
	Harvested as 3 sea-winter salmon	289	4 777
	Total net decreased catch	23 879	234 970
Home	Homing as 2 sea-winter salmon	16 494	163 620
	Homing as 3 sea-winter salmon	4 482	74 087
	Total gain to home waters	20 976	237 707

3 SEA-WINTER SALMON

	Impact	Numbers	Pounds
Newfoundland	Affected	1 225	20 249
	Harvested later in same year	25	413
	Total net decreased catch	1 200	19 536
Home	Homing as 3 sea-winter salmon	1 041	17 208
	Total gain to home waters	1 041	17 208

Table 4. Impact of introduction of Option 2A to the Newfoundland commercial salmon fishery on Quebec origin Atlantic salmon in that fishery

1 SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	738	3 255
	Harvested later in same year	28	123
	Net loss end of 1st year	710	3 132
	Harvested as 2-sea-winter salmon	35	347
	Harvested as 3-sea-winter salmon	2	33
	Total net decreased catch	673	2 752
Home	Homing as 1 sea-winter salmon	422	1 861
	Homing as 2 sea-winter salmon	126	1 250
	Homing as 3 sea-winter salmon	41	678
	Total gain to home waters	589	3 789

2 SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	29 669	294 316
	Harvested later in same year	1 035	10 267
	Net loss end of 1st year	28 634	284 049
	Harvested as 3 sea-winter salmon	88	1 455
	Total net decreased catch	28 546	282 594
Home	Homing as 2 sea-winter salmon	25 076	248 754
	Homing as 3 sea-winter salmon	1 996	32 994
	Total gain to home waters	27 072	281 748

3 SEA-WINTER SALMON			
	Impact	Numbers	Pounds
Newfoundland	Affected	1 318	21 787
	Harvested later in same year	0	0
	Total net decreased catch	1 318	21 787
Home	Homing as 3 sea-winter salmon	1 298	21 456
	Total gain to home waters	1 296	21 456

Table 5. Impact of introduction of Option 2B to the Newfoundland commercial salmon fishery on Quebec origin Atlantic salmon in that fishery

1 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	870	3 837
	Harvested later in same year	41	181
	Net loss end of 1st year	829	3 656
	Harvested as 2-sea-winter salmon	49	486
	Harvested as 3-sea-winter salmon	4	66
	Total net decreased catch	776	3 104
Home	Homing as 1 sea-winter salmon	539	2 377
	Homing as 2 sea-winter salmon	113	1 121
	Homing as 3 sea-winter salmon	39	645
	Total gain to home waters	691	4 143

2 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	22 047	215 706
	Harvested later in same year	1 584	12 713
	Net loss end of 1st year	20 463	202 993
	Harvested as 3 sea-winter salmon	194	3 207
	Total net decreased catch	20 269	199 786
Home	Homing as 2 sea-winter salmon	17 028	168 915
	Homing as 3 sea-winter salmon	1 893	31 291
	Total gain to home waters	18 921	200 206

3 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	980	16 199
	Harvested later in same year	8	132
	Total net decreased catch	972	16 067
Home	Homing as 3 sea-winter salmon	957	15 819
	Total gain to home waters	957	15 819

Table 6. Impact of introduction of Option 3A to the Newfoundland commercial salmon fishery on Quebec origin Atlantic salmon in that fishery

1 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	413	1 821
	Harvested later in same year	12	53
	Net loss end of 1st year	401	1 768
	Harvested as 2-sea-winter salmon	42	417
	Harvested as 3-sea-winter salmon	3	50
	Total net decreased catch	356	1 301
Home	Homing as 1 sea-winter salmon	117	516
	Homing as 2 sea-winter salmon	121	1 200
	Homing as 3 sea-winter salmon	39	649
	Total gain to home waters	277	2 361

2 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	25 414	251 107
	Harvested later in same year	1 332	12 213
	Net loss end of 1st year	24 082	238 894
	Harvested as 3 sea-winter salmon	107	1 769
	Total net decreased catch	23 975	237 125
Home	Homing as 2 sea-winter salmon	21 430	212 586
	Homing as 3 sea-winter salmon	1 418	23 440
	Total gain to home waters	22 848	236 026

3 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	1 125	18 596
	Harvested later in same year	0	0
	Total net decreased catch	1 125	18 596
Home	Homing as 3 sea-winter salmon	1 108	18 315
	Total gain to home waters	1 108	18 315

Table 7. Impact of introduction of Option 3B to the Newfoundland commercial salmon fishery on Quebec origin Atlantic salmon in that fishery

1 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	708	3 122
	Harvested later in same year	14	62
	Net loss end of 1st year	694	3 060
	Harvested as 2-sea-winter salmon	55	546
	Harvested as 3-sea-winter salmon	4	66
	Total net decreased catch	635	2 448
Home	Homing as 1 sea-winter salmon	406	1 790
	Homing as 2 sea-winter salmon	109	1 081
	Homing as 3 sea-winter salmon	38	628
	Total gain to home waters	553	3 499

2 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	18 891	187 399
	Harvested later in same year	1 489	14 771
	Net loss end of 1st year	17 402	172 628
	Harvested as 3 sea-winter salmon	142	2 347
	Total net decreased catch	17 260	170 281
Home	Homing as 2 sea-winter salmon	14 850	147 312
	Homing as 3 sea-winter salmon	1 385	22 894
	Total gain to home waters	16 235	170 206

3 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	980	16 199
	Harvested later in same year	8	132
	Total net decreased catch	972	16 067
Home	Homing as 3 sea-winter salmon	957	15 819
	Total gain to home waters	957	15 819

Table 8. Impact of introduction of Option Québec to the Newfoundland commercial salmon fishery on Québec origin Atlantic salmon in that fishery

1 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	785	3 452
	Harvested later in same year	50	221
	Net loss end of 1st year	735	3 241
	Harvested as 2-sea-winter salmon	67	665
	Harvested as 3-sea-winter salmon	7	116
	Total net decreased catch	661	2 460
Home	Homing as 1 sea-winter salmon	261	1 151
	Homing as 2 sea-winter salmon	200	1 984
	Homing as 3 sea-winter salmon	66	1 091
	Total gain to home waters	527	4 226

2 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	26 806	265 916
	Harvested later in same year	1 209	11 993
	Net loss end of 1st year	25 597	253 923
	Harvested as 3 sea-winter salmon	282	4 661
	Total net decreased catch	25 315	249 262
Home	Homing as 2 sea-winter salmon	20 592	204 273
	Homing as 3 sea-winter salmon	2 798	46 234
	Total gain to home waters	23 390	250 507

3 SEA-WINTER SALMON			
Impact		Numbers	Pounds
Newfoundland	Affected	985	16 282
	Harvested later in same year	0	0
	Total net decreased catch	985	16 282
Home	Homing as 3 sea-winter salmon	970	16 034
	Total gain to home waters	970	16 034

APPENDIX XV.

Table 1(a). Numbers of pounds of Atlantic salmon of Newfoundland-Labrador origin affected by Option 1B estimated poundages which would be caught by commercial fishery in subsequent weeks and estimated poundages which would escape into Newfoundland-Labrador rivers under conditions of the traditional fishery.

Area	No. of pounds of Nfld.-Lab. fish affected	Proportion caught	Pounds later caught by commercial fishery	Proportion escaping into rivers	Pounds escaping into rivers
A	213,189	.35	74,616	.65	138,573
B	131,959	.35	46,186	.65	85,773
C	57,401	.35	20,090	.65	37,311
D	67,893	.35	23,763	.65	44,130
E	56,468	.30	16,940	.70	39,528
F	82,916	.30	24,875	.70	58,041
G	0	-	-	-	-
H	41,046	.20	8,209	.80	32,837
I	0	-	-	-	-
J	160,155	.20	32,031	.80	128,124
K	0	-	-	-	-
L	0	-	-	-	-
M	0	-	-	-	-
N	7	.00	0	1.00	7
O	15,945	.00	0	1.00	15,945

Table 1(b). Additional numbers of pounds of salmon angled and excess escapement resulting from Option 1B under conditions of the traditional fishery.

Area	Escapement to all rivers	Labrador rivers			Newfoundland rivers		
		Escapement	Angled (4%)	Excess	Escapement	Angled (18%)	Excess
A-E	345,315	34,079	1,363	32,716	311,236	56,022	255,214
F-N	219,009	0	0	0	219,009	39,422	179,587
O	15,945	15,945	638	15,307	0	0	0
Total	580,269	50,024	2,001	48,023	530,245	95,444	434,801

Total provincial excess escapement 482,824 lbs.

Table 2(a). Numbers of pounds of Atlantic salmon of Newfoundland-Labrador origin affected by Option 2A estimated poundages which would be caught by commercial fishery in subsequent weeks and estimated poundages which would escape into Newfoundland-Labrador rivers under conditions of the traditional fishery.

Area	No. of pounds of Nfld.-Lab. fish affected	Proportion caught	Pounds later caught by commercial fishery	Proportion escaping into rivers	Pounds escaping into rivers
A	76,960	.25	19,240	.75	57,720
B	71,298	.25	17,825	.75	53,473
C	57,401	.20	11,430	.80	45,921
D	67,893	.20	13,579	.80	54,314
E	56,468	.20	11,294	.80	45,174
F	82,916	.20	16,583	.80	66,333
G	7,755	.15	1,163	.35	6,392
H	9,283	.15	1,392	.85	7,891
I	252	.15	38	.85	214
J	192,667	.15	28,900	.85	163,767
K	0	-	-	-	-
L	0	-	-	-	-
M	0	-	-	-	-
N	7	.00	0	1.00	7
O	15,945	.00	0	1.00	15,945

Table 2(b). Additional numbers of pounds of salmon angled and excess escapement resulting from Option 2A, under conditions of the traditional fishery.

Area	Escapement to all rivers	Labrador rivers			Newfoundland rivers		
		Escapement	Angled (4%)	Excess	Escapement	Angled (18%)	Excess
A-E	256,602	17,962	718	17,244	238,640	42,955	195,685
F-N	244,804	0	0	0	244,804	44,065	200,739
O	15,945	15,945	638	15,307	0	0	0
Total	517,351	33,907	1,356	32,551	483,444	87,020	396,424

Total provincial excess escapement = 428,975 lbs.

Table 3(a). Numbers of pounds of Atlantic salmon of Newfoundland-Labrador origin affected by Option 2B estimated poundages which would be caught by commercial fishery in subsequent weeks and estimated poundages which would escape into Newfoundland-Labrador rivers under conditions of the traditional fishery.

Area	No. of pounds of Nfld.-Lab. fish affected	Proportion caught	Pounds later caught by commercial fishery	Proportion escaping into rivers	Pounds escaping into rivers
A	76,960	.25	19,240	.75	57,720
B	71,298	.25	17,825	.75	53,473
C	57,401	.20	11,480	.80	45,921
D	67,893	.20	13,579	.80	54,314
E	56,468	.20	11,294	.80	45,174
F	82,916	.20	16,583	.80	66,333
G	0	-	-	-	-
H	41,046	.20	8,209	.80	32,837
I	0	-	-	-	-
J	160,155	.15	24,023	.85	136,132
K	0	-	-	-	-
L	0	-	-	-	-
M	0	-	-	-	-
N	7	.00	0	1.00	7
O	15,945	.00	0	1.00	15,945

Table 3(b). Additional numbers of pounds of salmon angled and excess escapement resulting from Option 2B under conditions of the traditional fishery.

Area	Escapement to all rivers	Labrador rivers			Newfoundland rivers		
		Escapement	Angled (4%)	Excess	Escapement	Angled (18%)	Excess
A-E	256,602	17,962	718	17,244	238,640	42,955	195,685
F-N	235,309	0	0	0	235,309	42,356	192,953
O	15,945	15,945	638	15,307	0	0	0
Total	507,856	33,907	1,356	32,551	473,949	85,311	388,638

Total provincial excess escapement = 421,189 lbs.

Table 4(a). Numbers of pounds of Atlantic salmon of Newfoundland-Labrador origin affected by Option 3A estimated poundages which would be caught by commercial fishery in subsequent weeks and estimated poundages which would escape into Newfoundland-Labrador rivers under conditions of the traditional fishery.

Area	No. of pounds of Nfld.-Lab. fish affected	Proportion caught	Pounds later caught by commercial fishery	Proportion escaping into rivers	Pounds escaping into rivers
A	46,308	.25	11,702	.75	35,106
B	32,253	.25	8,063	.75	24,190
C	33,917	.20	6,783	.80	27,134
D	44,676	.20	8,935	.80	35,741
E	39,124	.20	7,825	.80	31,299
F	69,166	.20	13,333	.80	55,333
G	3,966	.15	595	.85	3,371
H	1,364	.20	273	.80	1,091
I	(- 2,485)	.15	(- 373)	.85	(- 2,112)
J	110,817	.15	16,623	.85	94,194
K	0	-	-	-	-
L	0	-	-	-	-
M	0	-	-	-	-
N	7	.00	0	1.00	7
O	15,945	.00	0	1.00	15,945

Table 4(b). Additional numbers of pounds of salmon angled and excess escapement resulting from Option 3A under conditions of the traditional fishery.

Area	Escapement to all rivers	Labrador rivers			Newfoundland rivers		
		Escapement	Angled (4%)	Excess	Escapement	Angled (18%)	Excess
A-E	208,303	12,528	501	12,027	196,275	35,330	160,945
F-N	98,663	0	0	0	98,663	17,759	80,904
O	15,945	15,945	638	15,307	0	0	0
Total	323,411	28,473	1,139	27,334	294,938	53,089	241,349

Total Provincial excess escapement = 269,183 lbs.

Table 5(a). Numbers of pounds of Atlantic salmon of Newfoundland-Labrador origin affected by Option 3B estimated poundages which would be caught by commercial fishery in subsequent weeks and estimated poundages which would escape into Newfoundland-Labrador rivers under conditions of the traditional fishery.

Area	No. of pounds of Nfld.-Lab. fish affected	Proportion caught	Pounds later caught by commercial fishery	Proportion escaping into rivers	Pounds escaping into rivers
A	46,808	.25	11,702	.75	35,106
B	32,253	.25	8,063	.75	24,190
C	33,917	.20	6,783	.80	27,134
D	44,676	.20	8,935	.80	35,741
E	39,124	.20	7,825	.80	31,299
F	69,166	.20	13,833	.80	55,333
G	0	-	-	-	-
H	41,046	.20	8,209	.80	32,837
I	0	-	-	-	-
J	160,155	.15	24,023	.85	136,132
K	0	-	-	-	-
L	0	-	-	-	-
M	0	-	-	-	-
N	7	.00	0	1.00	7
O	15,945	.00	.0	1.00	15,945

Table 5(b). Additional numbers of pounds of salmon angled and excess escapement resulting from Option 3B under conditions of the traditional fishery.

Area	Escapement to all rivers	Labrador rivers			Newfoundland rivers		
		Escapement	Angled (4%)	Excess	Escapement	Angled (18%)	Excess
A-E	153,470	9,208	368	8,840	144,262	25,967	118,295
F-N	224,309	0	0	0	224,309	40,376	183,933
O	15,945	15,945	638	15,307	0	0	0
Total	393,724	25,153	1,006	24,147	368,571	66,343	302,228

Total provincial excess escapement = 326,375 lbs.

Table 6(a). Numbers of pounds of Atlantic salmon of Newfoundland-Labrador origin affected by Option Q estimated poundages which would be caught by commercial fishery in subsequent weeks and estimated poundages which would escape into Newfoundland-Labrador rivers under conditions of the traditional fishery.

Area	No. of pounds of Nfld.-Lab. fish affected	Proportion caught	Pounds later caught by commercial fishery	Proportion escaping into rivers	Pounds escaping into rivers
A	11,672	.20	2,334	.80	9,338
B	37,503	.25	9,376	.75	28,127
C	56,434	.30	16,930	.70	39,504
D	45,054	.30	13,516	.70	31,538
E	17,866	.20	3,573	.80	14,293
F	33,178	.20	6,636	.80	26,542
G	0	-	-	-	-
H	3,266	.15	490	.85	2,776
I	(- 2,485)	.15	(- 373)	.85	(- 2,112)
J	110,817	.15	16,623	.85	94,194
K	0	-	-	-	-
L	0	-	-	-	-
M	0	-	-	-	-
N	0	-	-	-	-
O	71,441	.00	0	1.00	71,441

Table 6(b). Additional numbers of pounds of salmon angled and excess escapement resulting from Option Q under conditions of the traditional fishery.

Area	Escapement to all rivers	Labrador rivers			Newfoundland rivers		
		Escapement	Angled (4%)	Excess	Escapement	Angled (18%)	Excess
A-E	122,800	12,157	486	11,671	110,643	19,916	90,727
F-N	123,512	0	0	0	123,512	22,232	101,280
O	71,441	71,441	2,858	68,583	0	0	0
Total	317,753	93,598	3,344	80,254	234,155	42,148	192,007

Total provincial excess escapement = 272,261 lbs.

APPENDIX XV.

METHODS

Impact of the six options on salmon of Newfoundland and Labrador origin, with respect to additional salmon angled and excess escapement.

Methods for obtaining excess escapement using Tables 1(a) and (b) as an example: Table 7 is a summary table showing method of calculations for all stocks of fish released for Option 1(B).

1. The salmon of Newfoundland-Labrador origin released from each area by a particular option when the fishery would be closed were summed from the weekly catches in Appendix II.

   In Table 1(a) the pounds of Newfoundland-Labrador fish affected in each area was obtained from Appendix II. Eg. for Area A, Option 1(B) affected the sum of catches of Newfoundland-Labrador origin fish in weeks 6-9 and weeks 17-34, a total of 213,189 pounds.

2. The proportions of fish on an area of origin basis were arbitrarily derived from known migration routes.

   Thus, the portion caught in column 3 of Table 1(a) was derived and summarized in Table 7. For Area A, the 213,189 pounds of Newfoundland-Labrador fish affected were arbitrarily divided into four (4) components, Area O, M and N, A, and others. This division was based on existing knowledge through marine tagging of migration patterns, the degree of regulation by a particular option, knowledge of component stocks and relative production in various Areas. The proportion of each component which would be caught later in the commercial fishery was arbitrarily estimated using tagging studies, times of fishing in adjacent areas and timing of runs to the rivers as a guide. Thus, for Area O component in Table 1, the exploitation rate was 0.70 and those for Area M and N; Area A, and others, were 0.25, 0.15 and 0.30 respectively. The overall estimate of 74,616 pounds caught was used in column four of Table 1(a).

3. The pounds escaping into rivers was calculated by subtracting pounds caught later in commercial fishery from the total pounds of Newfoundland-Labrador fish affected. Thus for Area A (Table 1(a)) 138,573 lb of the fish affected there escaped later to Newfoundland-Labrador rivers.

4. Some of these fish escaping into Newfoundland-Labrador rivers would also be angled. Angling harvests for Newfoundland-Labrador rivers were separated into Newfoundland and Labrador components because of the wide difference in angling exploitation rates in rivers of the two areas. The fish escaping to rivers (from Table 1(a)) were summed for Areas A to E, F to N and O and presented in Table 1(b); the pounds of fish caught were subtracted from total affected and the sum for these entered in the second column of Table 1(b) for Newfoundland and Labrador rivers. This is 34,079 pounds in the example of Areas A to E for Labrador rivers from Table 1(b). The angling exploitation rates were based on the total angled

catch in 1973, 1974, and 1975 and the total estimated river escapement in those years for Newfoundland and Labrador.

For example, in Table 1(b), 345,315 pounds of fish would escape from commercial fisheries in Areas A to E, and of these 34,079 pounds escaped to Labrador rivers, of which, 1,363 pounds were angled and 32,716 pounds were not caught. Similar calculations were made for other commercial fishing areas and for fish destined for other rivers and a total provincial escapement excess of 482,824 pounds (48,023 + 434,801) estimated.

Table 7.

Method of arbitration for deriving overall proportions of Newfoundland-Labrador salmon, released as a result of imposing OPTION 1(B), that would be caught at a later date during the same year in other Newfoundland-Labrador areas.

In Area A 213,189 pounds of Newfoundland-Labrador fish affected.

Area of origin	Component (lbs)	Proportion caught	Pounds caught
O	53,297	.70	37,308
M,N	53,297	.25	13,324
A	53,297	.15	7,995
Other	53,298	.30	15,989
Total	213,189	.3500	74,616
Overall Estimate		.35	74,616

In Area B 131,959 pounds of Newfoundland-Labrador fish affected.

Area of origin	Component (lbs)	Proportion caught	Pounds caught
O	32,990	.70	23,093
A	26,392	.15	3,959
B	26,392	.15	3,959
M,N	2,639	.25	660
Other	43,546	.30	13,064
Total	131,959	.3390	44,735
Overall Estimate		.35	46,186

In Area C 57,401 pounds of Newfoundland-Labrador fish affected.

Area of origin	Component (lbs)	Proportion caught	Pounds caught
O	11,480	.70	8,036
A	11,480	.25	2,870
B	14,350	.20	2,870
C	5,740	.15	861
Other	14,351	.35	5,023
Total	57,401	.3425	19,660
Overall Estimate		.35	20,090

Table 7 (Cont'd.)

In Area D 67,893 pounds of Newfoundland-Labrador fish affected.

Area of origin	Component (lbs)	Proportion caught	Pounds caught
O	10,184	.70	7,129
A,B	13,579	.25	3,395
C	13,579	.15	2,037
D	3,395	.15	509
Other	27,156	.35	9,505
Total	67,893	.3325	22,575
Overall Estimate		.35	23,763

In Area E 56,468 pounds of Newfoundland-Labrador fish affected.

Area of origin	Component (lbs)	Proportion caught	Pounds caught
O	5,647	.70	3,953
A,B	14,117	.20	2,823
C,D	2,823	.15	423
E	100	.00	0
South coast	11,294	.25	2,824
West coast	22,487	.30	6,746
Total	56,468	.2970	16,769
Overall Estimate		.30	16,940

In Area F 32,916 pounds of Newfoundland-Labrador fish affected.

Area of origin	Component (lbs)	Proportion caught	Pounds caught
A,B	8,292	.25	2,073
C,D	8,292	.20	2,073
South coast	24,875	.25	6,219
West coast	41,457	.30	12,437
Total	82,916	.2750	22,802
Overall Estimate		.30	24,875

In Area H 41,046 pounds of Newfoundland-Labrador fish affected.

Area of origin	Component (lbs)	Proportion caught	Pounds caught
G	8,209	.25	2,052
H	12,314	.10	1,[illegible]
I	8,209	.20	1,642
J	8,209	.20	1,642
West coast	4,105	.35	1,437
Total	41,046	.1950	8,004
Overall Estimate		.20	8,209

Table 7 (Cont'd.)

In Area J 160,155 pounds of Newfoundland-Labrador fish affected.

Area of origin	Component (lbs)	Proportion Caught	Pounds caught
J	40,039	.10	4,004
West Coast	120.116	.20	24.023
Total	160.155	.1750	28.027
Overall Estimate		.20	32.031

In Area O 13,943 pounds of Newfoundland-Labrador fish affected.

None of these fish would be caught since the fishery would close on August 31.